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ABSTRACT

The purpose of this book is to help teachers learn about promising materials, methods and techniques for teaching creative thinking and problem solving in their classrooms. Information about teaching methods or techniques which can be readily adapted by the teacher to fit any grade level and subject area are presented. Specific directions on how to get a project started in the classroom are given. Also presented are guidelines for developing learning modules or packages for teaching creative thinking and problem solving. In the book there are also outlined and described the procedures for organizing a workshop on creativity and problem solving. The workshop plan proposed is based on use of this book as a resource tool. The book also offers a variety of research and development abstracts of publications related to creative thinking and problem solving. The appendix contains the descriptions of published teaching material for specific grade levels and subject areas. (Author/AM)

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TEACHING CHILDREN HOW TO THINK

Synthesis, Interpretation and Evaluation
of Research and Development on
Creative Problem Solving

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FINAL REPORT

Synthesis, Interpretation and Evaluation of Research and Development on Creative Problem Solving for Elementary Teachers of Disadvantaged Children

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Chapter 1

Teaching Children to Think

Introduction

The purpose of this book is to help teachers teach children how to think and especially how to think creatively. Much time in the classroom is spent teaching information and basic skills in reading and mathematics. Very little is used to teach children how to use information and basic skills in thinking, solving problems, or creating new ideas.

Creative thinking is the ability to think of a lot of ideas where there is a problem or a need for ideas. It is also being able to think of many different ideas, to think of unique or original ideas, and to develop or elaborate ideas. Sometimes it is asking good questions which clarify a problem. It is also being able to translate ideas into forms of communication or expression which make it possible for other people to grasp the ideas or solution to problems. Thus, it is necessary to find words or use art media, music, drama, or movement to express our ideas, solutions, or feelings.

In an increasingly complex, ever changing, challenging and problem-ridden world, people of all ages have great need to be good creative thinkers and good problem solvers. However, the greatest hope for improving thinking lies with children in school. It is easier to arrange the conditions in school to help children learn how to think than to try to change adults, most of whom are no longer involved in formal education.

Children from some economically disadvantaged and low-income minority families are more likely than middle class children to face serious problems in many aspects of their lives. Thus they have a special need to become good thinkers, good problem solvers.

This book is directed especialy to teachers of children from economically disadvantaged and low-income minority families, but it is likely that all teachers will find the information useful in improving their teaching of thinking, creative thinking, problem solving, critical thinking, and inquiry.

An attempt was made to assemble and evaluate a large amount of information about teaching materials and methods, especially for teaching creative thinking and problem solving. However, it was found that such materials are often closely related to the teaching topics of inquiry and critical thinking. Therefore, these topics are dealt with in reviews whenever some aspect of creativity or problem solving was identified as a part of critical thinking and inquiry.

It was also recognized very early in the project that most of the time in typical classrooms is devoted to the usual curricular or subject matter areas such as social studies, language arts and reading, science and mathematics. Thus, it was decided that it might be best to give teachers information on how to teach thinking within regular subjects as much as possible.

Finally, it was recognized that a lot of guidance and direction from teachers on the job would be needed. Thus, nearly one hundred teachers in Atlanta, Kansas City, Indianapolis, and Los

Angeles were interviewed. In addition, questionnaires were given to hundreds of other teachers in grades kindergarten to six. Thus, a great deal was learned about teachers' needs, problems and concerns in trying to teach children to think.

An Overview of This Book

Chapter Two discusses the rationale for this project. It is designed to provide an overview of problems and approaches in teaching disadvantaged children and in teaching creativity and problem solving in general. A theoretical conception of problem solving is also presented.

Chapter Three presents information about teaching methods or techniques which can be readily adapted by the teacher to fit any grade level and subject area. Nothing need be purchased. These are methods and techniques for teaching creative thinking, problem solving, and inquiry. Often no special materials are needed. No AV equipment is needed. However, it will usually be necessary to adapt the technique to fit a particular grade level or subject matter.

Chapter Four provides more specific directions on how to get a project started in the classroom. It gives detailed directions for creativity and problem solving exercises and procedures for implementing them in the classroom. Chapter four also presents guidelines for developing learning modules or packages for teaching creative thinking and problem solving.

Chapter Five outlines and describes procedures for organizing a workshop for teachers on creativity and problem solving. The workshop plan proposed is based on use of this book as a resource tool. The reviews of instructional material in the Appendix of this book are used in the workshop, along with direct experience in examining instructional materials, to help teachers learn how to teach creative thinking and problem solving.

Chapter Six offers a variety of research and development abstracts of publications related to creative thinking and problem solving. The first section deals with studies on methods and materials for teaching creativity and problem solving; the second section focuses on teaching creativity and problem solving in the context of the basic curricular areas such as mathematics, social studies, and language arts; and the third section is concerned with theoretical studies of creativity and problem solving and the characteristics of creative children.

The Appendix contains the descriptions of published teaching material for specific grade levels and subject areas. It is divided into two main sections. The first section includes reviews of commercially published materials dealing with creativity and problem solving. The second section includes reviews of books that can be used, either through the suggestions that they give on methods of teaching creative thinking or problem solving, or by actually using them as stimulus materials. The best way to use the Appendix is as a reference source to familiarize yourself with the great variety of materials that are available. In this way you will be better able to choose materials to fit your specific needs.

Summary

The purpose of this book is to help teachers learn about promising materials, methods and techniques for teaching creative thinking and problem solving in their classrooms. In many schools teachers are developing broad new methods for open and individualized instruction. Most of the material reviewed and presented in this book for teaching creative thinking and problem solving will work well in open and individualized classrooms. Creative thinking and problem solving are intensely personal and individual experiences which thrive in an open classroom climate. However, teachers who maintain a more traditional classroom organization will also find that many of the materials and methods are adaptable to their needs and organization. A wealth of good ideas and good materials is available for teachers who are industrious, intelligent, creative, and motivated to apply them in their classrooms.

Chapter 2

The Project Rationale

Introduction

There is an urgent need to improve instruction in creative problem solving for disadvantaged children. The many social and political problems which face our nation will best be solved by citizens who have become good thinkers. Creative problem solving is the major and essential ingredient of effective thinking. The purpose of this project was to review research and development on promising methods, programs or sets of instructional materials for teaching creative problem solving to disadvantaged children. The report is designed chiefly for teachers and principals of elementary and junior high disadvantaged youngsters. In addition to complete information about the material there are also suggestions to teachers to guide them in developing new creative problem solving activities as demonstration projects. The ultimate purpose is to get more teachers of the disadvantaged to introduce instruction in creative problem solving in their classes.

Problem

While teaching for effective thinking and problem solving has long been a stated goal in American education, there is substantial evidence that this goal is not being achieved by our schools. Educators have observed the discrepancy between our goals and actual school practices. The critics of education have not, apparently, stimulated any widespread change in classroom behavior. As the world is confronted by an increasing number of critical problems, and students become increasingly sensitive to the need to be educated to solve them, more and more pressures are brought to bear on teachers and school administrators. Intensive efforts are needed to provide teacher, administrators, and students with the skills, resources, and information that are needed to broaden the range of instructional activities. The need for such efforts is dramatically underscored when specific consideration is given to disadvantaged segments of our population.

A Conception of Creative Problem Solving

Guilford and Hoepfner (1971) have carried out extensive research on problem solving abilities. They conclude that there is no single problem solving ability. Instead, there are a number of abilities involved in the complete problem solving process. They concluded from their factor analytic studies of problem solving that the following abilities are major cognitive functions in problem solving: (1) thinking rapidly of several characteristics of a given object or situation; (2) classifying objects or ideas; (3) perceiving relationships; (4) thinking of alternative outcomes; (5) listing characteristics of a goal; and (6) producing logical solutions (pages 104-107).

Rationale

Children from some disadvantaged families face severe handicaps at home and in school in their cognitive development. Effective thinking, creativity, and problem solving are neither valued highly, nor adequately modeled, in the home, and teachers lack skill in developing these abilities among children in the schools. The problem addressed in this project was to provide a comprehensive, interpretive survey of theory and research concerning the need, implementation, and evaluation of materials and methods for fostering creative development and improving problem solving abilities among disadvantaged elementary school pupils. The material produced in the project will be intended to be directly useful for classroom teachers and school administrators in schools in which large numbers of disadvantaged elementary school pupils are enrolled.

The definition of disadvantaged children used in this project refers to youngsters who have suffered some deficit in their cognitive development due to socioeconomic and/or ethnic background factors in their homes, schools, and communities. Cicirelli (1972) described three models which attempt to explain the causes of student deficit. Of these models the most appropriate for the point of view of this project is the environmental deficit model. This model asserts that the failure of the disadvantaged to achieve results from a lack of stimulation in the environment. Other deficit models Cicirelli describes are the genetic deficit model and the nutritional deficit model. The genetic deficit model argues that differences in intelligence are hereditary and that environmental manipulation can do little to improve school achievement for the disadvantaged. The nutritional deficit model suggests that lack of school achievement by the disadvantaged may be the result of inadequate prenatal or early childhood nutrition which affects brain development and general health.

There are two other broad viewpoints of the disadvantaged which emphasize school disparity and deactualization (Cicirelli, 1972). The school disparity model views students as well equipped to learn if the schools would choose the proper methods to teach them. Those who adhere to this model suggest that a cultural difference exists between the disadvantaged student and the middle class school. Others suggest that disadvantaged students have basic attitudes and values which have been learned in a culture of poverty. These values are very different from values held by American mainstream culture. Some have suggested that the cognitive deficit exhibited by disadvantaged Americans is due solely to teachers' and administrators' prejudice against children of the poor and their expectations that such children will not be able to achieve.

The third view of the disadvantaged suggests that the underachieving child is one who has not been motivated or given the opportunity to actualize his/her potential. This deactualization model, based on a humanistic view of the individual as unique and basically good, suggests that individuals are motivated to develop their fullest potential in relation to their own goals and values.

Creativity and problem solving have been united into a single complex concept following the model proposed by Guilford (1967). This model stresses the fact that many discrete creative abilities such as fluency, flexibility, and orginality, while measureable and trainable separately, are in reality indispensable components of realistic and complex problem solving behavior. Puzzle type problems might involve only restricted logical thinking abilities. Real life problem solving is really creative problem solving in that it requires a wide range of creative, conceptual and logical thinking abilities.

It is a frequently expressed goal of American education, at all levels, to foster cognitive growth among children, and particularly to help children think creatively and to become better problem solvers. In their text, Teaching for Thinking, Raths, Wasserman, Jonas, and Rothstein (1967) state the case, in general terms, as follows:

> There is a widespread verbal recognition of the importance of thinking. We want our children to be able to think for themselves, to be self-directing, considerate, and thoughtful. In situations which are new to them we hope they will be able to apply knowledge which they have gained in the past. (p. 1)

The importance of research on creativity and problem solving more specifically has been described by Parnes (1967), Torrance (1965, 1967), Torrance and Myers (1970), Guilford (1967) and others. Guilford has described the importance of creative problem solving in education in an especially provocative way:

> It is apparent that the solutions to numerous human problems are dependent upon education of the world's population. . . . An informed people . . . is a creative, problem-solving people (1967, p. 12).

Despite the fact that teaching pupils to think creatively and to solve problems are central goals of education, American schools have failed to a large extent to provide appropriate instruction; this problem seems especially critical for disadvantaged children. While some problem solving activities are found in most science and mathematics curricula, and in some social studies programs, they tend to follow narrowly-prescribed traditional modes of inquiry, and frequently involve trivial problems. Furthermore, even these simple attempts are often not included in the curriculum in inner city schools.

Many of the characteristics which teachers appear to value most highly, and so to cultivate in their classrooms, may be inimical to the improvement of creative thinking and problem solving abilities. Torrance observed:

> ...teachers and parents give evidence of being more concerned about having "good children", in the sense of their being easy to manage, well-behaved, and adjusted to social norms. It is rare that we are genuinely willing for a child to achieve his potentialities (1965, p. 14).

The problem of developing "good" or well-behaved children as opposed to teaching children to become more creative thinkers and better problem solvers is particularly acute in inner-city schools. Teachers in these schools are very much concerned with discipline and "good behavior." Frequently, such behavior is emphasized at the expense of more appropriate cognitive goals.

There are also indications that many of the skills and cognitive abilities which are stressed in school are likely to result in further handicaps for disadvantaged children. Many studies have shown that disadvantaged children often perform poorly on the measures of achievement, intelligence, and cognitive development which are predominantly used in public school settings (Bloom, Davis, and Hess, 1965; Deutsch, Katz, and Jensen, 1968; Frost and Hawks, 1966; Kennedy, Van DeRiet, and White, 1963).

Examples of areas in which disadvantaged children have been found to be limited, which may also be importantly related to the development of problem solving, creative thinking, and other complex cognitive abilities, include: verbal skills and symbolic representation (Vairo and Whittaker, 1967; Blank and Soloman, 1969; John, 1963; John and Goldstein, 1967); abstract thinking and flexibility (Roberts, 1967; Hirsch, 1969; Jensen, 1968); general reading abilities (Stauffer, 1967); and problem solving (Feldhusen, et al., 1972; Houtz and Feldhusen, 1975).

Recent research has been directed towards the identification of strengths of disadvantaged children. Torrance (1973) developed a checklist to assist in the identification of creatively gifted disadvantaged children. This checklist presents a variety of behaviors that may be observed when children are actively engaged in classroom activities. The behaviors reflect strengths and abilities which can be developed through appropriate instruction.

Often, disadvantaged children's classrooms include instructions, books or problems which are too abstract or meaningless for them. Instead, they need first to understand concepts on a "personal" level, by working with those things with which they are most familiar.

Children must learn to determine differences between relevant and irrelevant information, to make hypotheses, and to evaluate their ideas. Bruce (1967) asserts that these aspects of problem solving are neglected in schools. Although texts may show how others have sought answers to their questions, disadvantaged children need to be active participants in solving problems which are relevant to them in order to develop these cognitive processes. Jarvis (1965) stressed the need for disadvantaged elementary school children to be explicitly taught the intellectural operations of critical thinking, rather than teaching them what to think, or expecting that they will learn these operations as a by-product of their classroom studies.

Instead, teachers should introduce problem solving instruction, and through this instruction develop the material (Jarvis, 1965). Kelson (1968) suggested that the curriculum should include materials built around real or relevant problems. Using such materials, knowledge and skills could be introduced as needed. There would be no need to teach discipline-oriented knowledge simply because it might be useful later.

Dawson (1970) called for learning situations which would interest the students, relate to their daily lives, and involve them in the learning process. Dawson found that role playing with realistic problem situations can be used to encourage the students to engage in planning, imaginative thinking, problem solving, and discussion. He concluded that students not only learned by handling relevant problems through acting them out, but also learned to take and give criticism.

Torrance (1974) recently suggested that planning for and thinking about the future be used as vehicles in developing children's creative thinking and problem solving abilities:

> Schools are accustomed to teaching to deepen children's understanding of a present event by helping them learn about its history. It is just as important to help them speculate knowledgeably about the event's future (p. 65).

Disadvantaged children can use their positive strengths and abilities in oral expression, movement, and acting as well as in discussion, writing and creative art to tackle the problems of the future. Hopefully such experience will better equip them to deal with present problems.

Ross (1968) asserted that there are no disadvantaged children in art, since all children have feelings and can express them.

Techniques were described to help students become more aware of their environment. By having them photograph various scenes around the city they began to see the environment in a new way and tried to shape it artistically. By doing this, Ross argued, they could develop insights and perceptions necessary to reshape the environment in later years. This assignment also had other influences. The students were able to question (and try to answer) what their place was in the environment. The photographs and paintings helped them compare objective reality to a subjective record thereby offering them a better view of the world. The creative study of their environment may also have produced some parallel growth in other areas. The students seemed to be more motivated to read, to gain more information on the subjects photographed, and to write about their creations.

Torrance (1969) proposed that developing the potential of disadvantaged children is possible, but that our efforts have been limited by our failure to identify and develop the talents which are valued by particular subcultures. Torrance identified a set of "creative positives," which he concluded occur among disadvantaged children with high frequency, and upon which programs for the development of talent might successfully be created. These "creative positives" were: high non-verbal fluency and originality; high creative productivity in small groups; adeptness in visual art activities; high creativity in movement, dance, and other physical activities; high motivation for games, music, sports, humor and concrete objects; and rich imagery in language. Torrance (1969, 76-77) also described characteristics of school programs for disadvantaged children which have attempted to provide opportunities for talent development (Witt, 1968; Howe, 1969; Bruch, 1969).

Torrance (1971) reviewed studies of differential performance of racial groups and socioeconomic class comparisons on measures of creative thinking in a wide variety of geographic areas. In reviewing more than a dozen studies, Torrance noted that in relation to verbal creative thinking abilities, most studies reported either superior performance by advantaged pupils, or no significant differences. In many studies of non-verbal creative thinking abilities, however, disadvantaged students scored as well or better than more advantaged groups. Torrance concluded that the creative potential of disadvantaged children must be respected and developed in school and community programs. Such emphases may be as important as or even more important than emphases on compensation of deficits.

Approaches to Training

It seems there are many different ways for teachers who recognize the importance of creativity and problem solving to bring training in these areas into their classrooms. Teachers can also plan ways to use this training in subject areas already in the curriculum. However, teachers need to have a better understanding of creative problem solving before they can present it to their students (Jarvis, 1965). Above all, the problem of providing training which may be too abstract, and therefore irrelevant and confusing for the child, must be avoided.

Disadvantaged children are greatly influenced by the environment in which they live. Their homes and school experiences may affect them in such a way as to hinder their growth in concept formation, verbal proficiency, and transition from concrete to abstract thought. These areas are important in the development of problem solving abilities.

A number of programs and sets of instructional material are now available for teaching creative problem solving. While it seems that creative and energetic teachers can do much to develop and use their own materials and methods for teaching creative problem solving, hopefully systematically developed and evaluated materials could make the teacher's task easier or could help teachers do a better job.

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Chapter 3

Methods of Teaching Creativity and Problem Solving

Fostering A Creative Classroom Climate

Creativity can be viewed as a process of change in thinking and action. The combination of ideas previously unconnected into a novel idea or concept requires change. In order to foster creativity in your classroom, it is necessary to create an atmosphere that is receptive to new ideas. A positive, reinforcing, accepting climate is the basic ingredient necessary for the nurturance of creative behavior. Many obstacles to creative thinking are emotional reactions to insecure feelings which are caused by fear of new or different ideas. By suggesting novel ideas people open themselves to criticism. It is often easier to conform to the norm than risk making a fool of yourself by expressing a novel idea or thought. New or different ideas can flourish in an open system, one that is flexible and oriented towards the individual student. In such an atmosphere, the emphasis rests on the student's interests and ideas. This can be accomplished by creating a climate of mutual respect and acceptance between students and teacher.

It is sometimes difficult to be creative because of learned attitudes. These attitudes are often expressed by statements such as "I have a mental block against math" or "I'm not very good at solving puzzles." Blocks in thought patterns which inhibit creative thinking may be caused by perception or emotion.

By encouraging and reinforcing unusual ideas, children's attitudes can be positively directed towards a willingness to think and experiment with new ideas. Continued support and positive attitudes from the teacher are the fuel necessary to power the positive motivational climate that will set the stage for a creative atmosphere. An environment of adaptation to individual pupil's needs and interests, willingness to modify and vary planned activities in the interest and support of the students, and emphasis on divergent thinking skills will result in a warm and spontaneous climate which will spawn creativity in delightful dimensions.

Here are some general suggestions for creating an atmosphere conducive to creative thinking:

1. Support and reinforce unusual ideas and reponses of students.
2. Use failure as a positive to help students realize errors and meet acceptable standards in a supportive atmosphere.
3. Adapt to student interests and ideas in the classroom whenever possible.
4. Allow time for students to think about and develop their creative ideas. Not all creativity occurs immediately and spontaneously.
5. Create a climate of mutual respect and acceptance between students and between students and teachers, so that students can share, develop, and learn together and from one another as well as independently.
6. Be aware of the many facets of creativity besides arts and crafts: verbal responses, written responses both in

prose and poetic style, fiction and nonfiction form. Creativity enters all curricular areas and disciplines.

7. Encourage divergent learning activities. Be a resource provider and director.

8. Listen and laugh with students. A warm supportive atmosphere provides freedom and security in exploratory thinking.

9. Allow students to have choices and be a part of the decision-making process. Let them have a part in the control of their education and learning experiences.

10. Let everyone get involved, and demonstrate the value of involvement by supporting student ideas and solutions to problems and projects.

Inquiry, Discovery, Problem Solving and Creativity

Problem solving is the process of recognizing an obstacle, difficulty, or inability to act; thinking of possible solutions; and testing or evaluating the solutions. The inquiry, or discovery, approach to learning has been labeled the complete problem solving process. This approach has the unique advantage of making a learning experience meaningful to the individual learner.

The process of inquiry begins when individuals question something in their experience. The teacher can structure students' learning experiences in such a way that they will question. Once they begin to inquire, intrinsic interest takes hold and a learning by discovery process takes place.

There are three phases involved in the inquiry problem solving process. The first is awareness, sensing that a problem exists.

This is the motivating factor which arouses the student to go further in defining and resolving a problem. Once the problem is brought into awareness, the problem formulating stage begins. During this phase the problem is defined and ideas arise for plausible solution strategies. It is during this phase that information about the problem is gathered, usually through inquiry behavior such as questions and trial-and-error behavior. The next stage is searching. During this period questioning and information gathering begin to be associated with the formulation of viable hypotheses. Backtracking to reconsider and recapitulate on information may occur in this phase.

When all necessary information has been gathered and a plausible hypothesis has been formulated and tested, the problem solvers may feel their problem has been resolved. The answers to inquiry procedures may not always be a product of the same inferences and generalizations, even within the same manipulative situation, for the inquiry process is individualized according to any one individual's questioning pursuits and interests. The inquiry approach is necessarily a divergent thinking technique. Each student will approach the problem with a unique background of experience and focus and direct activities towards goals that are real and meaningful.

Inquiry techniques work well in the classroom in which a warm, open classroom atmosphere prevails. Conditions that foster creativity will also promote inquiry, for students involved in a discovery process must feel free to combine new ideas, ask questions, share their thoughts and reactions, and express their ideas without excessive pressure of peer competition.

Inquiry-discovery teaching is an indirect teaching method. The teacher becomes a guide and facilitator to set students on the road to discovery. The teacher must supply information and materials as students need and inquire about task relevant information. Inquiry learning involves manipulation of the learning environment which is meaningful and relevant to children. A variety of well selected materials can serve to guide students towards the discovery of concepts and principles. Environments in which students are free to choose alternative instructional materials tend to increase inquiry activity.

The use of media is especially appropriate to the introduction of problems and the exploration of ideas and hypotheses which students formulate. Learning centers, for example, provide the necessary freedom of manipulation and availability of materials which inquiry learning requires. Small groups are an excellent means of hypothesis testing and physical manipulation of materials, and role playing is a natural outlet for testing and manipulating social problems and questions.

In all situations, students are actively and meaningfully involved in a personal learning situation. Children will sense problems, ask questions, request and gather information before making decisions when decisions are necessary but no specific problems demand solution. "Inquiry, in essence, is the pursuit of meaning by seeing if one's own ideas about an object, or phenomenon, are substantiated by one's actual experiences with, or observations of, it (Strain, 1970, p. 117)."

Creativity is inherently related to the discovery process. Creativity is present in the production of questions and hypotheses, and in the combination of known facts and principles into manipulations of the unknown and development of solution strategies. Experience with discovery learning enhances creative performance by forcing the learner to manipulate the environment and produce new ideas.

The learner must be flexible to examine alternative solution strategies and hypotheses, and must elaborate and define needs in the quest for information. All of the creative processes, fluency, flexibility, elaboration, and originality are thus incorporated in the discovery-inquiry problem solving process.

The basic considerations to be met in an inquiry learning experience are:

1. Provide the initial experience to interest students in inquiring about a problem, concept, situation, or idea. The use of media, role-playing, and demonstrations are generally successful investigative starters. Learning centers which place the student in a problem situation with a number of viable options are an excellent beginning.
2. Provide the students with manipulative situations and materials to begin avenues of exploration. Games, media, files, sourcebooks, and discussions are all good starters.
3. Supply information sources for students' questions. Outside sources, field trips, speakers, peers, and the teacher are good supplements to written sources. The

community and the world at large are fair game in the information seeking stage.

4. Provide materials and equipment that will spark and encourage student experimentation and production.
5. Provide time for students to manipulate, discuss, experiment, fail, and succeed.
6. Provide guidance, reassurance, and reinforcement for students' ideas and hypotheses.
7. Reward and encourage acceptable solutions and solution strategies. Use failing experiences as instructional motivators, question why a solution will not work, ask open-ended questions. A supportive positive climate will spawn the best results.

Expecting the Unexpected: Questioning Techniques

In order to help children become good thinkers, we need to give them something to think about. The most common method of getting children to think is to ask questions. However, asking questions that require children to think requires much more thought and preparation by the teacher than asking questions which have one correct response. Convergent questions that have one right answer are useful in evaluating the learning of information, but they require few thinking skills on either the part of the teacher or the learner.

Questions which facilitate creative thinking are divergent or open-ended questions. These questions are often the springboard for a discussion, having a number of possible answers.

Open-ended questions are stimulating if the children express interest in the subject area, and they may evoke questions from the students as a consequence of the teacher's questioning. In order to be effective, open-ended questions must deal with material familiar to the students.

Divergent questions can provide access to all of the cognitive skills children need to acquire. Questions can be asked at all thinking levels and abilities. Higher level questions (analysis and evaluation) produce better evaluative skills than do the questions on lower levels. Questioning divergently helps children develop skills in gathering facts, formulating hypotheses, and testing their information.

Questioning also supplies valuable information to the teacher. Arthur A. Carin lists seven reasons teachers ask questions in his article "Techniques for Developing Discovery Questioning Skills:"

1. To arouse interest and motivate children to participate actively in a lesson.
2. To evaluate pupils' preparation and to see if their homework or previous work has been mastered.
3. To review and summarize what is taught.
4. To develop insights by helping children see new relationships.
5. To stimulate critical thinking and development of questioning attitudes.
6. To stimulate pupils to seek out additional knowledge on their own.
7. To evaluate the achievement of goals and objectives of lessons.

(Carin, 1970, p. 14.)

Here are some guidelines to follow in developing your own questioning techniques:

1. Prepare questions before a lesson.

2. Ask questions simply and directly and avoid excessive wording. Vary the way you word questions. Ask ques-

tions which stimulate students' creative thinking processes (comparison, just suppose, interpretation, criticism, etc.).

3. Use some simple information questions to break the ice and to induce student participation, particularly for children who are fearful about responding to thought questions.
4. Allow sufficient time, after a question is asked, for children to think and to formulate possible answers or responses. Avoid calling on the first student whose hand is up.
5. Reinforce and encourage all children's efforts to respond even though their contributions might be wrong. If a child's response is incorrect, offer a correction or call for a response from another child, but try to avoid any sense of ridicule or "put down" of the child whose response was wrong.

Here are some illustrative questions based on the concepts of fluency, flexibility, and originality for a lesson on the Pony Express:

Fluency: What are all the ways mail might have been transported across the United States at that time?

Flexibility: Most of the time we think of the horse as a means of transportation for the rider and mail. Can you think of other ways a horse could have been used to communicate information from one place to another?

Originality: Can you think of some very unusual way that no one else has thought of to transport mail today?

Critical Thinking

There is more to thinking than meets the ear. The ability to give the right answer to a question may or may not be a significant accomplishment, depending on the thought processes that took place before the answer surfaced. Critical thinking involves evaluation and consideration of the information available to the thinker. Critical thinking involves creative thinking because it requires the thinker to assimilate information and hypothesize solutions to problems.

Five basic steps are employed in the critical thinking process:

1. Recognizing problems.
2. Formulating hypotheses.
3. Gathering pertinent facts or data.
4. Testing and evaluation.
5. Drawing conclusions.

Classroom activities can be geared to developing critical thinking in children. Instruction must be organized in such a way that children are supplied background information and allowed to manipulate the information and discuss problems in order to discover their own conclusions. By learning to think critically, children learn to utilize and incorporate their acquired knowledge in a cumulative and productive manner.

Questioning and discussion sessions which employ divergent questioning techniques facilitate critical thinking. Children who are critical thinkers also need to be questioning learners.

Situational learning which provides information but causes a child to seek information rather than to simply process given information will aid in the development of critical thinking. Learning by doing, role playing, solving cases and problems, and experimentation are situational learning experiences. Simulations are also excellent ways to actively involve students in a learning situation and to induce and teach critical thinking.

Critical thinking is the productive thinking ability that enables us to solve problems, plan and implement ideas and activities, and handle life without a floor plan or set of directions. It should be the most important phenomenon of learning for a teacher to develop, and it definitely is a creative, productive activity.

Ennis (1962, p. 81) offers 12 criteria of critical thinking:

1. Grasping the meaning of a statement
2. Juding whether there is ambiguity in a line of reasoning
3. Judging whether certain statements contradict each other
4. Judging whether a conclusion follows necessarily
5. Judging whether a statement is specific enough
6. Judging whether a statement is actually the application of a certain principle
7. Judging whether an observation statement is reliable
8. Judging whether an inductive conclusion is warranted
9. Judging whether the problem has been identified
10. Judging whether something is an assumption
11. Judging whether a definition is adequate
12. Judging whether a statement made by an alleged authority is acceptable.

These criteria could be used as valuable guidelines to the teacher who is developing critical thinking activities in the classroom.

Brainstorming

Brainstorming is a technique used to produce ideas related to a particular problem, topic or theme. It is an excellent technique for strengthening imagination, flexibility, and discussion techniques. It is also a highly successful tool for problem solving that can be conveniently used in nearly every subject area and situation.

All ideas should be recorded. If the "recorders" are writing ideas, two work better than one since the ideas sometimes come fast and heavy. A tape-recorder is a good backup device to make sure no ideas are missed. It is also good to put all ideas on the blackboard because then they are available for all to see.

It is a good idea to gather all participants into a circle if possible, but normal classroom seating in rows will also be suitable. It is a good idea to announce the topic well before the actual brainstorming session to allow children to think about the topic a while before the brainstorming session. When the session begins the topic should be restated and children should be told the ground rules: 1) all ideas are accepted; don't evaluate; 2) try to get as many ideas as possible; 3) be open to combinations of ideas; and 4) don't be afraid to give silly or wild ideas.

Participants should be allowed to express their ideas as they come, but one at a time so that all ideas are recorded. "Hitch-hiking" is welcomed. That is, if one participant gleans an idea from another's idea, he/she should be allowed to give his/her new response immediately. Combining two or more responses is acceptable and encouraged.

The secret to brainstorming is deferred judgment. This means that criticism is ruled out. All reponses are accepted and evaluation (good or bad) is withheld until later. Some teachers like to keep a bell or buzzer handy to use as a warning signal that someone is criticizing or evaluating. Freewheeling is also welcomed. Wild, bizarre ideas are welcomed.

In brainstorming, the emphasis should be on quantity. Quality implies evaluation, which comes after the brainstorming session. Quantity is important. The larger the number of ideas produced, the more likely that many of them will be useful ones. The ideas generated tend to get more original as the session continues. Common ideas will be generated at first, then participants begin to stretch their minds for unusual reponses as the more obvious responses are offered.

After the session is over, members should be provided with a typed copy listing all the ideas generated. This can be used for further exploration, combination of ideas, and final selection of potentially useful ideas. Evaluation and selection of ideas to be implemented or developed should come from each member or from a select committee after the brainstorming session. It is often a good idea to have a postsession request for late ideas and thoughts. Then children can be assigned to project work groups to plan, elaborate, develop, and implement the ideas.

The topic for brainstorming should cover the problem statement but be broad enough to allow for freedom of thought. For example, when brainstorming for a unit on the family in social studies class, the question might be, "What are all the ways families could increase cohesiveness and togetherness?" For a unit on Japan, the question might be, "What are all the things we would like to learn about Japan?" In both instances, the ideas generated would be used as the foundations for developing other learning activities.

Brainstorming can be used in almost any area of the curriculum. Students can also be given problems in classroom planning and management (how to solve a trying discipline problem, things to be done in planning for a forthcoming field trip). In all instances brainstorming sessions should be followed by an evaluation session in which the best or most promising ideas are identified and plans are made for individuals or small groups to work on developing, elaborating, and implementing them.

Attribute Listing

The combination or modification of old ideas, concepts, and principles into new and novel ones is the basic premise behind creative thinking. Attribute listing is a technique that promotes a clearer view of the qualities, specifications, characteristics, limitations, and attributes of a problem to allow for easy change and the development of new ideas through the change.

Paper and pencil, chalkboard, transparency material, and an overhead projector are the main items of equipment needed. Attribute listing can be done by individual children or combined with informal brainstorming in group work.

The teacher can begin an attribute listing group project by defining the problem and writing it where it is readily visible to all the children. Then a chart such as appears in Figure 3-1 should be developed. In column form, three lists should be developed. In the first column, the problem is broken down into parts or components. In column two, the characteristics or attributes of each part are listed. In column three, ideas for improvement, based on ideas generated in columns one and two, are written.

After the ideas have been developed and listed they can be easily examined, discussed, and elaborated upon. If they pass the evaluator and receive approval from the group, the final step is implementation and resulting modification or solution of the problem.

Attribute listing can be used as a springboard for stimulating class discussions. The possibilities are endless. Social studies discussions, discussion of scientific principles and problems, character studies and story writing and discussions, and problem solving are some suggested areas in which attribute listing can be used.

Attribute listing could take place in large class discussions, in small group work, or individually. One idea is to supply handouts with column one already filled in. Attribute listing is a useful technique for developing new ideas.

Morphological Analysis

This technique involves the analysis of two or three components, specifications, or characteristics common to a particular problem situation or object. While attribute listing focuses on the modification principle of creative thinking, morphological analysis focuses on the combination principle, combining old ideas

Figure 3-1

Problem: How To Improve The Playground

Part or Component	Characteristics or Attribute	Ideas for Improvement
1. The ground surface	1. Grass Blacktop Concrete	1. Need more grass Use artificial turf
2. The placement of play equipment	2. In rows Close together	2. Vary placement Spread out Make game area
3. The baseball diamond	3. At far corner On dirt area	3. Put in grass Stationary bases
4. The swings	4. Very tall Metal chain Wooden seats	4. Need small ones Belt seats better
5. The water fountains	5. One fountain Made of concrete	5. Need more fountains Needs steps
6. The fence around it	6. Very high Chain link Blocks vision	6. Make it lower More open

Figure 3-2

Problem: Improving the Classroom Environment Using Common Materials and Available Equipment

	Components				
Materials	Floors	Walls	Desks	Tables	Chalk boards
Paper	Paper footprints to guide movement	Murals for walls	Paper desk pads for scratch paper work		
Cardboard	Use large pieces of cardboard as room dividers	Partitions study carrells	Use Tri-wall cardboard to build desks	Put cardboard boxes on tables for storage	Could get more black boards painting black on cardboard
Felt/Cloth	Bring in scraps to sew together to make a classroom carpet	Put up felt/burlap strips for display purposes	Make cushions for desk chairs		
Paint		May not be possible to do in some schools	Let each child decorate desk	Have color-coded tables for learning stations	Slate paint on walls, ceiling boards
Rubber	Old tires for sitting in				
Glass		Partitions to cut sound and noise down		Glass tops to lay over desks and tables with instructions underneath	
Plastic		Egg carton wall partitions good acoustic devices			

to produce novel ideas.

Morphological analysis involves the use of a grid system (See Figure 3-2). For easiest implementation of this technique, construct the grid with either two or three dimensions on a chalkboard or transparency and on individual handout sheets.

Like attribute listing, morphological analysis can be an individual thinking activity or combined with informal brainstorming as a group activity. The following steps are to be used, along with Figure 3-2, as an illustration:

1. Write the problem statement at the top of the matrix. In Figure 3-2 it is stated as follows: Improving the classroom environment using common materials and available equipment.
2. On the horizontal axis of the grid, list all of the types of things that are relevant to the problem. For example, one characteristic of the problem illustrated in Figure 3-2 is the parts of the classroom environment. Brainstorming may be used here to gather all of the varieties and types of a specific characteristic.
3. On the vertical axis of the grid, repeat the same procedure using another characteristic. In Figure 3-2 types of materials was used.
4. Combine the two characteristics to fill the cells. Some cells cannot be filled because they represent impossible combinations. Others lead to good ideas.
5. Evaluate the cell combinations and plan strategies for solution of the problem or development of the new product.

Morphological analysis is a formal way of bringing ideas together into combinations which might be useful in solving a problem or improving some things or situations. It requires clear explanations from the teacher concerning what is expected from the children and how to do it. If the problem is really interesting or relevant to the class, substantial interest and motivation will be generated. Morphological analysis, when carried out well, can lead to significant and useful solutions. Above all, the children learn a successful technique for thinking and solving problems.

Synectics

If I were an idea, how would I like to be formulated? Everyone has played such imagination games. The name of the game is synectics, and it was developed by William J. J. Gordon (Gordon, 1961). Synectics is a creative thinking technique that utilizes analogies and metaphors to help the thinker analyze problems and form different viewpoints.

No equipment is necessary, but it is a good idea to have paper or a chalkboard handy to record ideas. A group of people, a period of time free from other commitments, and a group leader are all that is necessary.

Synectics is a process whereby analogies are used in problem analysis. There are three types of analogies popular for use in synectics: 1) fantasy, 2) direct, and 3) personal. The use of fantasy analogies is the most common and is usually the lead-off in a synectics session. In fantasy analogies children search for the ideal solutions to a problem, but their solutions can be as farfetched or unusual as possible. Solutions may be dreamed up

Figure 3-3

Define the Problem

Write a statement of the problem.

Have an authority (teacher or guest speaker) give a demonstration or analysis of the problem

Have an idea session to air obvious solutions and prevent thinkers from getting stuck on obvious solutions

Redefinition

Thinkers rewrite the Problem statement for clarification.

Lead Off and Discussion

Leader begins the discussion and analogy sessions; all analogies are explored, ideas are recorded.

Force Fit

Recorded problem ideas and related situations are transferred to the original problem.

Viewpoint

This is the resulting solution or novel approach to the problem.

in fanciful, whimsical, even animated dimensions. The teacher may start off a session by asking the children to think up the ideal solution for a problem involving movement of a heavy piece of equipment on the playground. Analogies may be fantasized that include tiny nymph-like creatures carrying the equipment skyward, use of elephants, or giant balloons. These solutions are later forced into practical analysis for the design and solution of problems.

Another popular form of analogy is the direct analogy. Using this technique, synectics group members are asked to find parallel problem situations in real life situations. For example, moving heavy objects may be paralleled in real life situations by animals transporting their young. Spaceships carrying space exploration equipment would also be an example of the same problem situation in another setting. The main difference between fantasy and direct analogy procedures is that fantasy analogies can be entirely fictitious, whereas direct analogies must be actual parallels in real life to the problem.

Personal analogies bring an element of fantasy into the synectics session by placing participants in the role of the problem itself. The thinker might begin by saying "If I were a heavy swing set on the playground and I wanted to move to another place on the playground, what could I do?" The sequence of events in a synectics session might follow those shown in Figure 3-3. The following narrative is a fictitious account of a synectics session.

A fourth grade class is studying the organization of the post office. They have learned that breakage and damage is a major problem in the post office. The problem is written on the board as follows: How can heavy objects in the post office be moved with a minimum of manpower and maximum protection of the packages against damage? The class is taken on a field trip to the post office where they are told about the problems of package handling by postal workers.

After the return to the classroom, each student is asked to rewrite the problem on the board. Then the class identifies obvious solutions to the problem and writes them on the blackboard. Next, synectics discussion groups are organized. Each group must be led by the teacher or aides.

The leader begins with a fantasy analogy approach. Students are asked to imagine a situation in which packages are being moved. After a period of discussion, one student volunteers that the packages sprout arms and legs, and eyes and ears. The leader then asks for a forced combination of this analogy into the problem situation. The solution is then reexamined and it is suggested that the packages be placed on individual carrying devices that have remote sensing equipment and are self-propelled to a pre-programmed area.

Now, the leader asks for direct analogies. "What things move under their own direction and carry a heavy load?" Animals named are opossums and camels. A forced solution is then asked for between these animals and the problem at hand. Students hypothesize a device that is operated by pulleys and runs overhead, carrying packages suspended by hooks or magnets. This idea came from the analogy of opossums, which carry their babies clinging to their bellies. The idea of camels carrying weight between their humps is converted to mechanized carts with a large enclosed motor at each end, a carrying space between the motors, and a radar control system which directs the cart to a specified destination.

Finally, the leader asks for personal analogies. Students are assigned the role of packages and asked how they would like to be moved. The answers indicate concern for careful handling. One student shares a desire to float through the post office and settle gently at a destination. Another students asks to be moved with tender loving care. Forcing these ideas into the problem situation suggests that packages be allowed to float in a conveyor tank filled with foam packing pellets to appropriate stations in the post office.

At the end of the synectics sessions the leader gives the results and they are recorded on the board. In a follow up session the ideas are reviewed and evaluated, and the class finishes the activity by writing recommendations for package handling improvement to the Postmaster General.

Synectics is a fun way to involve students in imaginative discussions and come up with unusual and workable problem strategies. Any subject-related topic can be examined in small or large group discussions. Giving students an explanation of the method to be used and examples will help stimulate an effective synectics session. Through synectics children can learn valuable strategies for solving problems.

Forced Relationships

The technique of forcing relationships is a strengthening activity which helps develop the ability to see unusual uses for things and the combination of ideas from different viewpoints. The technique has four major approaches which will be summarized below. These are listing techniques, catalog techniques, focused relationships, and arbitrary forced relationships.

Listing Techniques

In this technique the problem statement is presented to the thinkers. A list of unrelated objects is then presented, or generated by the teacher or thinkers. This list has no relationship to the problem stated, and may in fact be produced before the introduction of the problem in order to lessen the tendency to choose related objects. The thinker must take each object on the list in turn and associate it with the problem statement. The objects themselves do not need to be related. The relationship should be derived by a free associat method, that is, taking the first relationship that comes to mind. By doing this, judgment of the relationship is initially deferred. After all relationships have been recorded, the children go back through the list and evaluate the ideas for possible modification, development and implementation. Evaluation of the responses should be recorded with a + or -. A third run through the responses serves as a planning stage to begin development of the ideas.

Here is an example of a forced relationship technique used to deal with the problem "Fighting on the Playground."

	List	Freely Associated Responses
+	magazine	Take magazines to playground for diversion of fighters.
+	grass	If they must fight, grass is better than blacktop, so plant grass.

-	oil	Oil shoes of the fighters so they can't stand up.
-	shoe	Make the fighters go barefoot in warm weather. Blacktop and gravel will hurt feet and prevent fighting.
+	puzzles	Give children puzzles to solve to calm them down.
+	ice	Use ice cream to reward good behavior.
+	typewriter	Let children type to reward good behavior.

Catalog Techniques

This technique is much like the listing technique. The problem is stated first. However, objects to be used in association with problem solutions are drawn randomly from a catalog. The catalog is opened at random and the child can use any object as seen there in creating a solution. The objects are then forced to fit the problem statement. The same steps of evaluation, development and implementation are then followed as in listing.

Focused Relationships

Focusing relationships follows the same lines as the catalog or listing techniques. However, the relationship of the objects to the problem statement is not completely random or arbitrary. The objects which will be forced to the problem statement should be pre-selected and in some way be relevant to the problem. For example, in the problem "Fighting on the Playground," typewriter would not be selected as a forceable object, but grass and shoe might be. Playground equipment, boxing gloves, rocks, and blacktop would be relevant to the problem. As with the other techniques, the relationship of the objects to the problem is freely associated, one object at a time. Evaluation is held off until all of the relationships have been created. Then development and implementation of the ideas is undertaken.

Arbitrary Forced Relationships

Arbitrary forced relationships do not involve the use of a problem statement. All that is needed is a group of arbitrary words, objects, or ideas. Two objects are selected at random and forced together. Ideas that are produced using this technique can then be developed. One good method of presentation is to fill a fish bowl with objects written on folded slips of paper. The thinker must pull out two slips, read the names of the objects, and force them together to create a novel idea. One published source for this technique is the Think Tank, developed by Savo Bojici. Think Tank is fully described in the Appendix of this book.

Classroom Strategies

These forced relationship techniques can be fun activities for the whole class, or very productive activities for individual students. They can be easily adapted for use in learning centers, and for seatwork activities between longer activities during the day. Here are some suggestions for using forced relationships techniques in classroom situations:

1. Provide catalogs for students to draw objects from and a list of problems from which children may pick those which they find interesting or stimulating.
2. Use a Think Tank, fishbowl, or idea box in a corner of the room or make a bulletin board with an idea box. Display students' ideas and forced relationships.

3. Provide words in lists for students to associate with a problem. Have a competition between two groups of students using the same lists and two different problems.

4. Let students brainstorm relevant ideas and objects for a particular problem, and then force relationships between their list and the problem.

These techniques can be used in almost any problem situation, whether it is subject matter related, or related to other classroom activities. They provide excellent experience in associative thinking and help children become better creative thinkers and problem solvers.

Summary

These various methods and techniques for teaching creative thinking, problem solving, inquiry, and critical thinking can be incorporated into the regular classroom subject matter or they can be organized as separate experiences. If they are related to subject matter, they will enhance both subject matter learning and the acquisition of skills in creative thinking and problem solving. It is important to remember that in using any of these methods, the goal is not to solve problems as such. Rather it is to help children develop their abilities to solve many kinds of problems in and out of school.

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Chapter 4

How To Get A Project Started In Your Classroom

Now that you have had an opportunity to explore some of the methods and materials that are available for you to use in your classroom, you may be anxious to get started on a project of your own. Perhaps you have already been working on some activities for helping children think creatively, and have located some promising new methods and materials to include. On the other hand, teaching for creative thinking and problem solving may represent a new direction that you are interested in trying out in your own teaching. Either way, by now you may be wondering how to get started. This Chapter should give you some useful ideas and suggestions.

Five General Guidelines

Your efforts at helping children become better creative thinkers and problem solvers will be more successful and more rewarding for you and your students if you approach your goal very systematically. Five general guidelines for planning, conducting, and evaluating your classroom project are:

1) Know what creative thinking and problem solving are as processes and abilities.
2) Determine what processes, skills, and content you want the students in your class to learn and develop.
3) Create an atmosphere in your class in which creative learning can occur.

4) Use learning procedures involving many activities and products.

5) Conduct a careful review and evaluation, not only of the students' learning, but of your own project and efforts, and plan revisions accordingly.

This Chapter will also be concerned with instructional packages (that is, with programs involving several lessons or units) for teaching creativity and problem solving. Five fundamental steps which you can use in developing materials will be discussed:

1) Know the basic components of an instructional package or program.

2) Analyze the content according to the creative thinking and problem solving processes that are to be included and develop a content outline for the subject area to be included in the package.

3) Search for and select creativity instructional materials, methods, and tasks to include.

4) Assemble the learning package and try it out.

5) Evaluate student and program performance.

Of course, there are many specific ideas and suggestions that will be useful to you in your efforts to implement these general guidelines. In this Chapter, these guidelines will be discussed more specifically, as will some of the hazards and pitfalls you must be prepared to deal with during your project.

1. Know what creative thinking and problem solving are as processes and abilities.

What are the components of the problem solving process? In order to teach students to think well, one must understand the process of problem solving. Sidney Parnes (1967) defines five stages of the creative problem solving process: (1) fact finding, (2) problem finding, (3) idea finding, (4) solution finding, and (5) acceptance finding.

Fact-finding involves using all of the information available about the problem. The problem solver must first examine all of the available information about his problem, much like Sherlock Holmes. Before a problem can be solved, it must first arise. The discovery of the problem is the first major step involved in problem solving.

Like a sleuth, the thinker must become aware of all information that might help to define the problem. Once all information is collected, and the clues to the problem are laid out, the task of problem-finding and problem definition presents itself. In this stage, children are like a sponge. They absorb information about the components of the problem. When thoroughly saturated, they can evoke a broader restatement of the problem. By wringing information out of the sponge and soaking it back up several times, children can analyze each element in the problem, arrange and rearrange the problem statement, and define the objectives of the problem. Finally, the problem may be broken down into sub-problems, and each component of the sub-problems analyzed for available information.

Once the problem has been adequately defined, and all information about the problem and the problem situation has been identified, the task turns to the generation of ideas and alternative solutions to the problem. Idea Finding is the generation and manipulation of ideas. Chapter 3 describes a number of methods and strategies that can be used to help produce responses in the idea-finding stage. Among these are brainstorming, checklisting, attribute listing, and morphological analysis. There are four major rules that apply to all of these methods, and to the whole concept of idea finding:

1) Do not criticize or evaluate ideas produced. Ideas should be free-flowing and unhampered at this stage.
2) The crazier, the better. Wild, imaginative ideas may become practical when forced into problem situations from a different viewpoint. The emergence of an unusual or bizarre idea may spark yet another and perhaps usable idea in fellow problem solvers.
3) The more the merrier. Quantity of ideas is important in the idea finding stage. Quality of ideas is not considered at this point. The more ideas there are, the greater the base for evaluating and selecting viable ideas becomes.
4) Work with others in the combination of ideas. No one person's idea belongs to that person, all ideas at this stage are shared. Ideas that sprout from other ideas that have been suggested are fair game.

After a considerable list of ideas has been formulated, the best and most practical or desirable idea to solve the problem must be sought. Herein lies the basis of the Solution-Finding stage in problem solving. Solution finding is the evaluation of ideas produced in the idea-finding stage, and the manipulation of the best idea into a solution strategy. Now is the time for consideration and discussion of each idea that was produced. Criticism may indeed occur here, along with speculation and elaboration about possible ways to implement an idea.

In the final analysis, the best idea may often turn out to be an unconventional idea, or one that may involve radical change. The final step in the creative problem solving process becomes acceptance finding. This merely suggests that a final consideration be made of the solution in order to implement the idea into a solution strategy.

Now you are aware of the stages a problem solver goes through in dealing with a problem. It is also important to understand the thought processes involved in these stages. There are four basic abilities involved in creative thinking. These are fluency, flexibility, elaboration, and originality (Guilford, 1967).

Fluency is a memory process. An individual gathers and stores information in his mind until it can be of use. The ability to recall information so that it can be used in the solution of a problem is a fluency process. Fluency can be observed in a class discussion when a pupil offers many ideas on one topic, or produces several ideas for the implementation of another individual's idea. Fluency is an important aspect of any idea-generating component. A student who provides many responses in an idea-producing session is illustrating fluency ability.

Flexibility is the ability to switch from one train of thought to another. In problem solving and creativity, individuals must be able to see a wide variety of applications to a particular concept. Flexibility requires the ability to adapt to alternative new situations and ideas. It also means not getting locked into particular or rigid ways of viewing the problem. Flexible thinkers can use information in a variety of ways. Flexibility can be observed in a class discussion when a pupil switches easily from one topic to another and incorporates several alternatives to each problem presented. A student who gets stuck on one idea, or who cannot relate his ideas to other pupils' ideas, is not being flexible. Flexibility is directly related to the problem solving processes. When you are defining a problem, you need to look for all of the possible alternatives which might be involved. If you get stuck on an alternative solution that is not the right definition, the best solution may never surface.

Originality is the ability to produce new, unique, or unusual ideas. Original thinking welcomes the strange and bizarre. Oftentimes, unusual ideas are the combination of two old ideas in a new dimension. The invention of the water bed may have originated from someone's desire to float off to sleep. Originality can be strengthened in students. Practice in trying to be original, acceptance of unusual ideas, and encouragement for students to go out on a limb and dream up kooky ideas are several approaches to the development of this important ability.

Elaboration is the ability to fill out an idea, to add details, and to build up groups of related ideas. Once an idea has been formulated, an individual must be able to bring it to fruition. Elaboration is extremely important in the solution finding stage when ideas are being evaluated for implementation into solution strategies. Elaboration is also important in the fact-finding stage. Once you define an element of the problem, you must be able to clarify and elaborate on how it relates to the conditions of the problem.

These basic processes that have been presented so far in the Chapter should be clearly understood before the teacher proceeds further in developing instructional material to teach creative thinking and problem solving.

2. Determine what processes, skills, and content you want the students in your class to learn and develop.

The important steps to remember in this goal have to do with developing goal statements and instructional objectives. Planning goals and objectives is an important step in preparing instruction which will effectively foster creative thinking and problem solving. The reason for this belief is quite simple: if you take the time to prepare goals and objectives, keeping deliberately in mind your intention of encouraging creativity, you will be more likely to include appropriate learning activities and outcomes. You will be less likely to overlook or omit creative thinking abilities in your planning. And finally, you will find it easier to develop new ideas for creative learning activities in every subject area.

The development of objectives which contribute to your efforts to foster creative thinking takes into account the content (or subject matter) that will be taught[1]. You should also deliberately consider the processes and abilities in creative thinking and problem solving, however, and check to insure that you have written objectives which involve the use of those processes and abilities. Some examples of statements of objectives which involve creative thinking abilities and problem solving processes have been provided by Covington, Crutchfield, Davies, and Olton (1972) in the Teacher's Guide for the Productive Thinking Program. Their summary of the skills of productive thinking includes being able to:

Recognize puzzling facts

Ask relevant, information-seeking questions

Solve problems in new ways

Generate ideas of high quality

Evaluate ideas

Achieve solutions to problems

Objectives for teaching creative thinking and problem solving can be both short and long range. Those illustrated above are long range objectives. Here are some examples of shorter range objectives:

Able to think of many things that the children in the story could do to escape from the giant.

Able to think of various ways the tree branches could have been used to escape.

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[1] A programmed text that will help develop good objective writing skills is: Kryspin, W. J. and Feldhusen, J. F. Writing Behavioral Objectives. Minneapolis, Minnesota: Burgess Publishing Co., 1974.

Able to write a different ending for the story and to fill in details.

Able to think of clever titles for the story.

All of these objectives, which some authors call enabling objectives, if achieved, would contribute to long range growth in creative ability. Through the formulation of short and long range objectives the teacher can specify which creative thinking and problem solving abilities and processes are to be taught.

3. Create an environment in your class in which creative learning can occur.

No amount of careful preplanning can reduce the importance of the classroom climate and what happens in the classroom when the project actually begins. Every teacher has doubtlessly known the experience of the very carefully planned lesson that falls flat on its face. Fortunately, there are many things you can do to help prevent the fates from determining the success of your project in the classroom.

Warm-up. Before beginning a lesson or activity the teacher should attempt to "warm up" the class. Even the greatest lesson plan will not be effective unless it includes some strategy for establishing a receptive psychological set among the students. One effective way of accomplishing this is by using open-ended questions which arouse interest or stimulate curiosity. Another is to talk with the children to determine what they already know or think about the forthcoming topic. Still another effective approach is to utilize a puzzling phenomenon or problem to stimulate the students to ask their own questions. Many teachers give thought to asking different questions, but never think of the possibility of beginning instruction with spontaneous student questions (cf., Torrance & Myers, 1971).

Physical arrangements. One important way of establishing a classroom atmosphere for creative learning is through careful attention to the physical arrangements of the classroom. For example, to use buzz groups effectively, it is necessary to seat small groups of students in circles. In some cases it might be helpful to push the desks aside and have the students sit on the floor. A brainstorming group can be as large as eight to ten students, while other kinds of group discussions, presentations, and demonstration projects may be best suited for an entire class.

If you are using an individualized approach in your project, you will probably also discover that you need to designate various parts of your classroom (or even other nearby rooms if they are available) for a number of individual and group activities throughout the day. If your room is large enough, you may well find it useful to use moveable dividers, portable chalk or bulletin boards, tables, or even home-made wooden or cardboard dividers to partition the room off into various activity areas. It is also worthwhile to include a special area for quiet relaxation and thinking; creative ideas often require a quiet period of time for "incubation."

Physical activity and productive noise. You must also keep in mind that many creative learning activities involve a greater degree of physical activity and discussion among students than are required by more traditional activities (particularly of the "seat work" variety). In your effort to develop a supportive environment for creative learning, don't work against your own purposes by being too rigid about movement, activity, and noise. There is an important difference, which you can soon learn to distinguish, between disruptive behavior and the "productive noise" and activity of children busily involved in tracking down new ideas and solutions to problems.

A stimulating classroom is filled with resources. There are things to explore, read, study, and examine. There are many things on bulletin boards. There are places to relax and talk. The teacher encourages children to talk, to move about, to share ideas. The children do not drift aimlessly. There is no chaos. There is much active pursuit of learning activities. But the atmosphere is relaxed and pleasant. In such a room creativity and problem solving can flourish.

Deferred Judgment. In Chapter 3, in relation to brainstorming, you read about the principle of "deferred judgment." This is also an important principle for the teacher to remember in working to establish a creative learning environment.

Premature and hasty teacher evaluation can destroy a child's first efforts at creativity or problem solving. Creativity and problem solving are risky ventures. There are many blind alleys, false starts, failures and frustrations. But children must learn to take the risks. This means that teachers must be slow to criticize. They should offer guidance, direction, and praise for any successes. They should also help students to learn and practice the deferred judgment principle among themselves, to avoid harsh criticism of each other's efforts. Children should also be encouraged to evaluate their own work, and given opportunities to learn how to do it, rather than being totally dependent on the teacher for evaluation.

Learning a facilitative role. When teachers first begin to consider the effects of increased student participation in planning, greater student independence in learning activities, and application of the principle of deferred judgment, it is easy for some misunderstandings to occur. Quite frequently, for example, an atmosphere for creative learning is confused with a totally "unstructured" or permissive atmosphere. Try to avoid the term permissive, because it is extremely value-laden and open to too many interpretations. Creative learning does place a great emphasis upon the active role of the learner in managing and directing learning activities independently. In many of the arrangements you develop to foster creativity, children will be somewhat noisier and more active physically than in traditional, self-contained, teacher-centered classrooms. But that does not mean that creative learning leads to children running around, screaming, shouting, or swinging from the light fixtures. Nor does it imply that learning is overlooked. Children involved in creative activities will not only be working toward important goals and objectives, but will be less likely to resort to aggressive or disruptive behavior.

Of course, the teacher must maintain control over the class, but a low authority profile will have the most beneficial results.

The teacher must act as a guide or facilitator when using creative methods. This means that the methods are student centered and not teacher centered. While relaxing control may be difficult, it is usually an essential ingredient in getting children to think for themselves. At first, the students may not be productive, but with encouragement, patience, and support they will make gains.

If the students feel they can rely on your constant support and encouragement they will not be frightened or anxious to give a response that may not be a popular one. When students are able to give responses that are unpopular and infrequently given by the other students, or even funny or ridiculous, they are more likely to think creatively. It is the teacher's responsibility to be accepting of the student's responses, to provide encouragement and reinforcement for all ideas, and to reduce or eliminate the criticism of the other class members. In fact, it is better to allow the humor and fun to flow, since this usually accompanies creative ideas. You can help the class most by laughing along with them. This will serve to reinforce the students for their original and flexible thinking and show that you are really serious about encouraging creative thinking.

The teacher must be very open and receptive to the ideas of all students. The teacher should not show strong approval of some children's productions while showing disapproval of others that seem silly, funny or unusual. Both quantity and quality of output will increase when evaluation is eliminated or at least postponed. This contributes to the supportive atmosphere that the teacher should try to foster, and reduces the fear and anxiety that reduces creative thinking and problem solving in young children. The children must also learn to express appreciation or enjoyment of each others' work while avoiding criticism, ridicule or sarcasm. The general classroom atmosphere should foster cooperative effort while allowing each child to think independently. The student must feel free to take risks in front of the other students and the teacher, and to express unusual, unique, or different ideas, without fear of ridicule. If students are embarrassed or punished for what they say or do, it is not likely that they will make future attempts at thinking and presenting their ideas to classmates.

Finally, when you are attempting to establish a favorable atmosphere for creative thinking and problem-solving, you must learn to develop a great deal of patience. You must be able to restrain yourself from "squelching" the child who is a constant source of new ideas. But, by the same token, you must also learn not to inhibit the efforts of students who are slower in getting started. They should also have encouragement, support, and adequate time for thinking about a problem.

4. Use learning procedures involving many activities and products.

After your efforts in planning many and varied activities and procedures to help students engage in creative thinking and problem solving, and in developing a facilitative atmosphere, there comes the time when teaching actually starts. Now your challenge is to work with your pupils in ways that will promote the successful attainment of your goals. You will have to work quite regularly at maintaining the classroom environment and helping students employ many different abilities and skills in learning. While this may be a challenge, especially in working with children who have never encountered such efforts before, it is usually very exciting and satisfying for teachers and pupils alike.

There are some things you must be careful to remember, however. First of all, strive to find new and diverse ways for students to express themselves and demonstrate what they are learning. Too often it is easy to restrict ourselves to tests and written reports, although there are many other things pupils can do. You may plan specific alternatives, or allow the students to participate in designing them. Some other products to consider using in your class include: songs and music; murals, sculptures, or paintings; movement and physical expressions; community or school service projects; and creation and production of original poetry and drama. You will find it valuable to encourage students to try their hand at expressing themselves in many different ways during a school year.

Creativity and problem solving projects can easily be integrated into the daily classroom routine either as a part of a particular subject area or independently. Many teachers set aside some special time during each day for students to work on their projects as a class, in small groups, or as individuals. If a special time is set aside, you may find it easier to establish a creative atmosphere in the classroom during that period. However, creativity and problem solving instructional materials can usually fit into any subject area that would normally be taught during the day. Many of the materials and methods described in the appendix were specifically designed to be used as a part of the regular curriculum. Thus the Purdue Creative Thinking Program was designed to be used in social studies. Many of the materials are designed for use in language arts and some for use in mathematics and science. When used in this way the materials have dual benefits in that they not only aid in the development of some specific skill or knowledge but they also help to develop creativity or problem solving in students.

As you attempt to utilize a variety of learning activities and employ different methods of facilitating creative thinking (such as those reviewed in Chapter 3), you will also find it useful to vary the size of work groups within the class. A useful technique, especially in conjunction with some of the methods in Chapter 3, is to break the class down into small groups. Usually groups of three to six students will be effective, although the best small group size is probably four. Brainstorming may be conducted with groups as large as eight to ten. It is useful to begin by demonstrating the method to the class as a whole, using a simple problem that will be easy for all students to follow. In this way you can be fairly certain that the class members understand the method. Then assign each group to a designated area in the classroom. Whether you use desks (if they are movable) or not, always have the students face each other in small clusters to facilitate communication and prevent the room from becoming too noisy. Spread the groups apart as far as possible, and even to other rooms if space and supervision are available.

The use of small groups gives you and the students many advantages for creative thinking and problem solving activities. It reduces the fear and anxiety that may be associated with speaking in front of the whole class. Students are more likely to offer contributions when they are in a small, personal, closely seated group of people. Furthermore, the reduced number of students allows more time for each of the students to be presenting ideas, since each person in the group can talk more often than when the whole class is together. This may be especially helpful for students who speak infrequently or not at all. Small groups also allow students to proceed independently without supervision since the teacher can only visit with one group at a time. Small groups can also work at their own pace, going as slow or as fast as is appropriate for the group members.

Interaction within small groups is also likely to occur at a more rapid rate than in a large group. It is characteristic of many of the creativity methods to require a constant exchange of ideas, questions, and suggestions. In a large group this exchange may be severely limited because only one person can speak at a time. In the small group, however, exchange can be much more frequent and more children can be involved.

After small groups have worked for some suitable time, the children can be brought together again as a whole class to report their findings. One class member from each group might report about the group's progress and ideas, with a follow-up discussion of the problem by the entire class.

You should also employ a variety of instructional techniques. Many teachers are already using large and small group discussion, some creative thinking techniques (such as brainstorming), a wide variety of films and other media, and individualized instructional efforts such as learning centers or learning stations. These can all contribute effectively to creative thinking, problem solving, and inquiry by students. You may find it particularly useful, however, to use a contract or learning agreement approach to help students learn to use instructional resources on their own.

5. Conduct a careful review and evaluation, not only of the students' learning, but of your own project and efforts, and plan revisions accordingly.

Your first concern in evaluation will probably be to seek effective ways of assessing the students' performance, and it is certainly necessary to do this. Creative learning does not imply that any concern for evaluation is dismissed. Although it is important to learn to defer judgment, there must come a time when you get down to the process of making decisions and assessing the quality of ideas and solutions. In relation to evaluation of the students, there are three specific suggestions you should consider. First, learn to define and use new sources of "evidence" in your evaluation. Do not feel constrained to evaluation using paper and pencil test scores and reports. By adopting a broad definition of evaluation, the questions you are striving to answer are: "Has the student reached the goal? How well has the job been done? What kinds of data do I have to support the decision?" Be alert, therefore, for any kinds of data to document the attainment of the goals and objectives by the students. Second, learn to use criterion-referenced evaluation, not just norm-referenced. It is not always necessary to compare students with each other. In creative learning outcomes, it may frequently be much more appropriate to assess the change or progress made by the learner from one time to another, or to examine the success of the learner's efforts in relation to the specific goals that were defined. Third, the evaluation of creative learning and problem solving should increasingly be conducted by the learner. It may be useful to begin with teacher-pupil conferences, daily planning and evaluation meetings with the entire class at the beginning and end of the school day. You can work with the class, to assist them in learning how to develop and apply standards or criteria of evaluation. Then, as they become more confident, you can introduce peer evaluation, which can easily be related to small group activities, and individual self-evaluation procedures. Of course, self-evaluation should not be something that the pupils do, only to have the results ignored by the teacher. When you employ self-evaluation activities, you must insure that the results are actually used.

One of the best sources of evaluation is the project activities which students carry out. Some teachers think of evaluation as something which is done with tests after the learning activities. However, evaluation can often be more effective if it focuses on the ongoing practice activities such as writing and drawing and provides feedback to students for improvement of their work.

You should also be concerned with evaluating your entire project. You may find it valuable to do this on a day-to-day basis, and not just at the completion of the entire project. Again, you should begin by going back to the general goals of the project: Why did you begin the project initially? What were you hoping to accomplish? Then, for each of your responses to these questions, ask yourself, "What kind of evidence would indicate whether or not that has actually happened?" For example, if one of your goals had been to foster fluency, flexibility, and originality among your students, how would you evaluate your project on that basis? Probably, you would want to ask, "What evidence is there that any of the students are getting more ideas, more different kinds of ideas, or more unusual and unique ideas?" Once you can determine the criteria, it should be easy to identify instances or situations which will give you the evidence you need. For example, how many places of instances during a typical school day can you identify in which you would have a chance to observe your students' ability to think of many ideas, their ability to look at a problem in many different ways, or their ability to create unique ideas? In classes, on the playground or in the lunchroom, in conversations with other teachers, through parent conferences--there are many possible sources you could use to gather data.

In designing evaluation measures for students, you should employ creative thinking and problem solving tasks comparable to the practice activities used during instruction. Tests of creativity and problem solving are rarely true-false or multiple choice. They are realistic tasks.

An important aspect of evaluation, which you should also remember, is that one purpose of evaluation is to provide you with a basis for systematic revision of the program. Thus, after you have collected the evidence to evaluate your project, don't just use it to say, "It worked." or "It didn't work very well" and then drop it at that. Instead, seek to probe the strengths and weaknesses of the program, and try to look specifically at each factor thus identified. How can you improve the strengths? What can be done to revise the weaknesses? What new ideas should be incorporated?

If you develop your project with an open mind, work steadily at planning and implementing a program, give serious consideration to many factors (such as those discussed in these guidelines), and evaluate your program thoroughly and honestly, it should be an extremely valuable professional experience for you, and an exciting and worthwhile learning experience for your students.

Some Things To Watch Out For

Almost inevitably, no matter how careful your planning and attention to the basic guidelines, things can go wrong and problems can develop (calling to mind the old 'principle' that, "If anything can possibly go wrong, it will"). These guidelines cannot protect you from those problems and aggravations that can accompany any approach to instruction. But there are some things that you can at least be warned about, in the hope that forewarned will be forearmed.

First of all, don't give up when your first efforts are rough around the edges. Give yourself a fair chance to grow and to develop your own creative abilities. Too many times educational projects are dropped prematurely, with the first signs of difficulty, only later to have someone say, "Oh yes, I did try that once, and it wasn't any good." You must not be overcome with the frustration of a first attempt, but remember that with more experience, success will be easier to attain.

Second, creative thinking and problem solving, like any other educational concerns, can be handled in such a way as to become dull, boring routines. Your students will need variety, and there will be pressure upon you to create new ideas, and to keep on creating. Creative learning is not a venture for the teacher who wants to build a neat little package to use the same way, day in and day out. You will have to be prepared to work very hard to be flexible and original yourself.

Third, you will have to be ready to accept and respond to a variety of original ideas from your pupils. You won't have the cushion of the right answers in the teacher's guide to fall back upon. There will be times when you will have to say, "I don't know," and these occasions can be threatening to some teachers.

Fourth, you will have to deal with many more variations in time and daily schedules. Creative thinking and problem-solving do take time. Individualized learning means that many children will be pursuing many different projects and activities throughout the day. At first, this may seem like chaos, but as you become more confident of the learner's efforts and your own organization, it will become much easier for you to tolerate.

Fifth, you must be prepared to create and maintain a constantly changing and growing pool of resources for learning. It won't do to put the goblins and witches up on the bulletin board in October and leave them there until the turkeys go up at the end of November. Nor will the reading table be adequately stocked with a few old books to last the year. There must be many different resources, and you will have to work hard to see that they are up-to-date and well suited to the changing interests and activities of the students.

Sixth, you may find that some of the traditional behaviors of teaching are difficult to change, particularly those which involve evaluation. When you look at someone's work, there may often be a persistent tendency to say, "Well, here's what you should do to correct this and that..." or "Let's see, this word is spelled wrong, and that idea isn't clear." It is difficult to learn to defer judgment, even when you know that eventually evaluation will occur. This will be a challenge to your own creative ability.

Seventh, it may be difficult at first to keep in mind that every child has the potential for creative thinking and problem solving. The concern is not merely with a few children who display exceptional creative talent but with providing opportunities for every child to develop these abilities and skills.

Eighth, some creative thinking activities may be viewed by children as sex typed. Creative dance, art, and poetry are viewed by some boys as girlish activities while mechanics, science, and sports are viewed by some girls as boy-type activities. Special efforts are needed by the teacher to overcome these sex-oriented responses. Above all, every creative and problem solving activity should be experienced by both boys and girls. If the experience is rewarding, most of the problems will be overcome or at least alleviated.

Ninth, creativity and problem solving methods and materials will demand a higher level of creative preparation from the teacher than traditional methods and materials. You will not be able simply to "follow the manual." More creative effort is needed to plan lessons, find materials, and guide ongoing learning activities.

Finally, you must make some decisions about your own values and commitments. You will be able to be most successful if you are concerned with fostering intellectual and personal growth in the individual child. You cannot view your job as mechanically "facing the little monsters every day" to get a paycheck if you are going to be successful in fostering creative learning, inquiry, and problem solving.

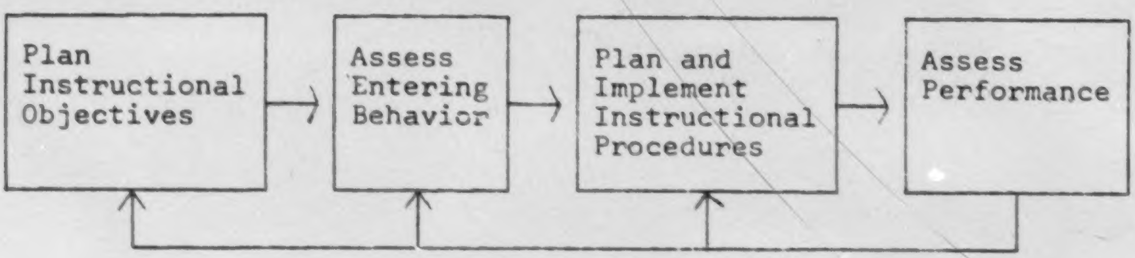
Using Your Own Instructional Packages

Many teachers are very actively involved in developing individualized or self-instructional learning packages for their students. These packages may utilize books, films, filmstrips, activities, or worksheets from a variety of published sources, or they may depend upon teacher-created materials. These projects are named in a variety of ways: Learning Centers, Learning Stations, modules or mini-courses, Learning Packages, and many others. While they are quite useful in teaching basic subject matter, it is also important to recognize that they can be used to teach creativity and problem solving. The teacher can do this in several ways. First of all, you can incorporate into your student learning packages some of the published materials reviewed in the Appendix. Second, if your package utilizes material you have previously developed, or other published material specifically concerned only with the subject matter, you can use the methods reviewed in Chapter 3 to develop supplementary creativity and problem solving activities and exercises for your students. Finally, if you feel very ambitious, you can build upon the ideas in the Appendix, the methods in Chapter 3, and the five guidelines below and create your own instructional package to teach creativity and problem solving.

1. Know the basic components of an instructional package or program.

Two models will be presented and illustrated in this section. These models of instruction deal primarily with the organization and planning involved in the production of instructional material packages.

The first model is a basic model of instruction (Glaser, 1962).


Plan Instructional Objectives
Assess Entering Behavior
Plan and Implement Instructional Procedures
Assess Performance

Planning instructional objectives is necessary for you to determine what you wish to have the children learn, and to communicate that information to them, as well as incorporate it into your learning package. This can be effectively accomplished by writing instructional objectives.

Assess entering behavior. In order to provide instruction for children that takes into account their individual needs and learning capabilities, it is necessary to determine their entering levels of ability. If you find that the children are not ready for your instruction, or have already passed the point at which your instruction was to begin, instructional objectives may need to be reevaluated and planned.

Plan and implement instructional procedures. Once you have determined what you are going to teach the children, and they are prepared for the instruction, instructional procedures can be planned and implemented. Instructional procedures may take on a variety of forms from the lecture, to varied group activities, to individual work. Media and resource material should be considered during this stage along with provisions for learning center activities, field trips, special projects, and special activities.

Assess performance. After you have completed all of the learning activities, you should evaluate both your children and the program of instruction. This may provide for changes in further implementation of the instructional program, and it will also help you to analyze whether your children learned what was originally provided for in the instructional objectives.

Once these basic parts of an instructional model are understood, the actual structure of instructional materials can be examined. One widely used form is the Learning Package (LP). A LP is a totally individualized mode of instruction. It provides for children's individual learning rate, and for the different ability levels that may abound within a group of children. A LP provides a working outline that tells the student what he is expected to accomplish, describes materials and activities that will help meet objectives, and provides for self-testing and evaluation of achievement. These are the basic components of a Learning Package:

(1) Rationale

(2) Objectives

(3) Self-Tests (over objectives). These may be in other form than conventional paper and pencil tests.

(4) Assignments. All assignments should be designed to help children accomplish the objectives. These may be in many and varied forms. Listed below are just a few examples of kinds of activities that may be used.

   (A) Optional or taped lectures

   (B) Information sheets

   (C) Resources and guidance in using resources

   (D) Experimentation

   (E) Media (filmstrips, video-tape, films and film loops, slides and transparencies)

   (F) Discussion sessions, simulated activities, and other small group activities

(5) Evaluation. Evaluation may be in the form of an activity, test, or assignment. Self-supplied feedback from activities or experiments may suffice. Teacher conferences about student performance are a good idea.

Having reviewed some of the fundamental principles of creativity thinking, problem solving, and instruction, you are now ready to begin creating an instructional package.

2. Develop a content outline for the subject area to be included in the package.

Many advocates of behavioral objectives insist that teachers begin work in developing a unit of instruction by writing the objectives. A better way to begin is by preparing a subject matter or content outline. The outline will not be used as a lecture guide, but will be used to develop objectives which focus on specific abilities to be taught through the topics in the content outline.

In a social studies class, the teacher might, for example, develop a content or subject matter outline as follows:

The Family

(A) Types of family structure
(B) The economics of family life
(C) Families and politics
(D) Evolution of family structure
(E) Current trends in family life

Under each of these headings the teacher would also be likely to identify subtopics to be taught.

After you have prepared the general content outline, you should consider the creative thinking and problem solving skills you intend to emphasize in the package. You may also want to include other processes, such as "knowledge," "application," "analysis," and "evaluation."

An easy way to begin this task is by using a sheet of newsprint or other over-size, plain paper. Enter your content outline at the left side of the page, from top to bottom (i.e., as the first column), leaving two inches or so at the top for column headings. Next, horizontally across the top of the page, enter the thinking skills or processes you want to be certain to include. As a suggestion, consider these categories for the thinking skills: information, application, fluency, flexibility, originality, elaboration, problem finding, hypothesis testing, and evaluation. (See Figure 4-1). Complete the lines on the chart, as shown in the figure, to partition off distinctly each of the boxes or "cells" on the chart.

Now examine carefully each box in the chart. Ask yourself, "Will this instructional package attempt to teach the learner this part of the content, using this thinking skill?" Not every topic in the content outline will necessarily have to be included under every thinking skill, of course. Make a small check in each box you plan to incorporate into the package (sample boxes have been checked in Figure 4-1 to illustrate this step).

Look at each of the boxes you have checked, one at a time. If you have checked a box which indicates a particular topic, your package should include something for the student to learn using that particular thinking process or skill. Thus, for each such

Figure 4-1

Instructional Package Planning Chart

	Thinking Skills								
Content	Info.	Applic.	Fluency	Flex.	Orig.	Elab.	Problem Finding	Hyp. Testing	Eval.
A) Type of families									
B) Economics of the family									
C) Families and politics									
D) Evolution of the family									
E) Current trends									

box, there should be one or more instructional objectives.

For example, for the first topic, you checked the fluency box. That means that the student will use this package to generate ideas about types of families. Here is an illustrative objective: To be able to think of many different basic types of families. For the topic "Families and politics" you checked originality. Here is an illustrative objective: Think of several unusual ways families might become involved in politics. For the topic "Evolution of the family" you checked problem finding. Here is an illustrative objective: Given a description of Eskimo family life, be able to identify problems faced by the family. Next, for the B topic, you also checked "application." This implies that you expect the student to learn to apply the information in this topic to other problems. Here is an example: To be able to plan a family budget.

The result of this will be that you will prepare a set of objectives in which the content and the thinking skills are planned. Note that this is merely a planning device; it does not impose upon you any sequence in which the student will study the material, but merely maps out in a systematic way the content and thinking skills that will be covered in the package.

Once the objectives have been formulated it is desirable to consider and possibly develop the evaluation procedures which will be used. Knowing how the children will be evaluated can provide valuable guidance to the teacher in later steps of developing a Learning Package. It can also be useful to administer some of the evaluation procedures immediately to determine exactly how much the children already know. This can keep you from "bringing coals to Newcastle" and help you determine a good starting level for the class.

3. Search for and select creativity instructional materials, methods, and tasks to include.

When you are developing an instructional packet, it is not necessary that every part of the packet be originally prepared for that purpose. You can use existing published resources very effectively. You should search for useful resources before you actually begin planning procedures and specific student learning activities. Look for books, articles, worksheets, problem sets, and exercises that can be used or easily adapted to relate to the objectives you have planned. There may also be published self-instructional programs, tapes, films, slides, filmstrips, models, demonstration kits, and other supplementary material that will be useful and save you the time and expense of having to develop your own. Some of these resources may be incorporated into your packet with only minimum change; others may require modification, excerpting, and the development of study guides to tell students how to use them. The reviews of material in the Appendix may be quite valuable to you in locating material which will not only be suited to the subject area in which you are working, but also because of their specific emphasis on creative thinking and problem solving. If the material is already available, it is a good idea to have it close at hand while you are working on the development of your packet.

Another step that will be useful to take before you actually begin to design specific learning activities for your packet is to review several techniques for promoting creative thinking that might be used in your packet. These techniques may provide you with useful ideas for designing learning activities, for individuals, small groups, or large groups. The methods and techniques reviewed in Chapter 3 provide a number of specific techniques to consider.

Another source of good ideas to review before you start to plan learning activities are tasks that have been used frequently in creativity research and training studies to foster children's creative thinking abilities. A summary of the tasks that may be useful to you is presented in Figure 4-2 (a, b, c). These tasks have been derived from a large number of research studies and training programs. The type of creative thinking ability that is strengthened or exercised is written across the top of the figure. Three processes are examined: (1) Problem awareness and information gathering; (2) idea production and hypothesis formation; and (3) evaluation and hypothesis testing. Categories of task types are listed on the left side of the page. Corresponding examples for particular task types are listed across from the appropriate task on the left side of the page.

4. Assemble the learning package and try it out.

Next, you should give careful thought to the actual procedures for using the package in the classroom. What materials will each

Figure 4-2a

Problem Awareness and Information Gathering. Sensitivity and awareness to problems. The discovery of problem situations and problem definitions.

Type of Task	Examples of Task Activities
Improvement	1. Product improvement. How could you make this product better? 2. Situation improvement. How could you change this situation, environmental improvement, etc.?
"What If" Situations	1. Just Suppose imagination activities. Story completion activities. Prediction of consequences.
Observation Activities	1. Finding camouflaged or hidden figures. Scrambled word games, word finding puzzles. 2. Clue finding, information hunting in stories. 3. Problem definition. Defining a problem from a mass of information.
Questioning and Speculation	1. Speculating on what is occurring in a picture or part of a story. 2. Writing newspaper headlines and story titles for pictures. 3. Completing pictures and designs from abstract or symbol line beginnings. 4. Solving riddles and puzzles.

Figure 4-2b

Idea Production and Formation of Hypothesis: Thinking up ideas, finding ideas from available information and constructing hypothesis for problem solutions.

Type of Task	Examples of Task Activities
Ideational Fluency	1. Thinking up unusual uses for things, writing as much as possible about absurd topics. 2. Writing similies, synonyms and antonyms for words and phrases. 3. Writing lists of words with pre-specified prefixes or suffixes. 4. Categorizing. List all of the things you can think of that are cylindrical in shape.
Flexibility	1. Find a variety of uses for common objects. 2. Make several drawings from line beginnings. Design symbols for words or ideas. 3. Indicate subtle changes in phraseology, figural drawings, or visual demonstrations. (Find the figure that is different, where did the change occur, etc.) 4. Find several solutions to physical puzzles (match stick puzzles, block puzzles, word puzzles.) 5. Story problems. What endings might this story have, etc.?
Improvement	1. Product improvement. How could you make this product better? 2. Situation Improvement. How could you change this situation, environmental improvement, etc.?
"What If Situations"	1. Just Suppose imagination activities. Story completion activities. Prediction of consequences.

Figure 4-2c

Evaluation and Hypothesis Testing: Making judgments about ideas and hypothesis previously formulated. Experimenting to test ideas. Generalizing consequences and results. Improving viable ideas, and checking hypothesis against the facts.

Type of Task	Examples of Task Activities
Elaboration	1. Adding details to drawings, designs, stories, or ideas. 2. Filling in outlines.
Associational Fluency	1. Writing synonyms and antonyms for words. 2. Producing lists of words that are associated with other words.
"What If" Situations	1. Just suppose imagination activities. Story completion activities. Prediction of consequences.
Experimentation	1. Manipulation of facts and actual trial of hypothesis through physical experimentation, simulated activities and games, role playing, etc.

child receive? How will they be distributed? What kinds of products will be called for, and how will the child be expected to demonstrate completion of the activities for any of the objectives? How will the children's work be reviewed and evaluated?

In general, as you develop your package, try to include a variety of activities, so that children may use different skills during a unit of study and complete several different kinds of products. Providing a variety of experiences, along with a blend of individual and group work, will help sustain the students' curiosity and interest. When testing is necessary, you can often arrange for it to be done individually by the children as they are ready. Frequently, children can take and score their own quizzes. You should also plan systematic "check points" or conferences through daily learning agreements with individual children, small group evaluation meetings, and class planning evaluation sessions. You may even decide for some units of study that the entire class can use a method like brainstorming to generate the topics for the content outline.

Check your plan for learning activities very carefully, to determine the amount of time various activities may require, the adequacy of your resources and supplies, and to plan any sequence that will be important for the student to observe.

Time requirements for any activity may vary considerably among children, of course. However, you can make a general assessment of the total amount of instructional time that may be required, on the average. Then consider how long it will take your fastest and slowest students to complete various activities, using your best estimates on the basis of their previous efforts. Give some thought to how to accommodate students' differing time requirements. Should some activities be required of every student, regardless of how long they will take to do? Are there some activities that might be omitted for slower children or added for faster ones? Are there some objectives (and corresponding activities) that may be reserved as "optional" work for children who progress more rapidly? Are there other packages or assignments (or opportunities for free reading, recreation, or relaxation) that should be planned in relation to individual pacing of the learning experiences?

Your plans for resources should also be checked carefully. If equipment is needed, will it be available when you need it? Will individual students be able to obtain it? Will they know how to use it? If books, articles, or other material are incorporated into the packet, will there be sufficient copies available for the number of students who may need it at the same time? If resources are limited, how can you best insure that every student has an opportunity to have adequate access? Do you need to duplicate study guides, worksheets, or other material? How many copies? How will these be distributed to the students?

You must also consider some decisions on sequence. Will every child study the various objectives and work on the same activities? Will they follow the same sequence, or will different plans be outlined for some students? Are there some choices which can be freely made by the students? Are there some objectives and activities which constitute critical prerequisites for other topics or activities?

The answers to these questions will be different, of course, in every package and in all classrooms. As you move more and more toward individualizing instruction to foster creativity and problem solving, you will have to consider these problems for each unit of instruction and each student. You will become more and more an instructional designer, a guide, and a facilitator of student learning, and less and less a fountain of wisdom and transmitter of information.

All of these questions should be answered through trying out the package with a small number of children. Watch their performance closely during the tryouts. Make notes of problems and necessary changes. Then make the necessary changes and revisions.

Now you are ready to begin using the package in your classroom. If this is the first opportunity your children have had to work with a Learning Package, you will have to give them some preliminary guidance. They should be encouraged to work independently and not turn to you whenever questions arise. Urge them to try to figure things out for themselves. If that fails they should turn to a neighbor who might already have solved the same problem. If all else fails, urge them to come to you for help.

Take time out now and then, possibly at the end or beginning of a day, to talk with the whole class about their experience with the Learning Package. Find out about problems and difficulties. If the Package calls for some group work, discussion, or brainstorming, assist in organizing these activities.

You will also have to be checking children's work products as they finish them and turn them in. Try to check them quickly and provide feedback, reinforcement or encouragement as soon as possible. After the excitement of trying out a new learning package, as assignments start to come in, or children begin to complete learning agreements and Learning Packages, the inevitable question arises, Did It Work? Now begins the final stage in the development of instructional materials, evaluation. There are two phases of evaluation to be considered, assessing each child's learning and assessing the effectiveness of the Package.

5. Evaluate student and program performance.

At testing and evaluation time we want to determine how much each child has learned or whether each child has achieved the objectives we set out to teach. It would be desirable to develop the evaluation procedures at the same time the Package is being developed. If pre and post self tests are developed, the actual tests which the teacher will use for evaluation should be developed at the same time. These tests can be short answer, true-false, multiple choice, and matching if an objective type test is needed for easy scoring.

Learning Packages always involve children in project activities such as writing reports, drawing, crafts, dramatizations, etc. Frequently the best, and most valid, evaluation is to judge the adequacy of the child's performance on such tasks. While it is more difficult to evaluate these things reliably, they have the advantage of being realistic evidence of what a child has learned to do.

Objective tests are often most suitable for evaluating children's achievement of information objectives. Essay tests can also be used for these and higher level objectives. Above all the testing and evaluation procedures must be validly related to the objectives. If one objective was "to be able to list many ideas which could be used in conducting an experiment," a fluency objective, it would not be valid to simply have a test item which called for a definition of fluency. The ideal evaluation procedure asks a child to perform the task, and evaluate how well he does it.

The final stage of evaluation is a comprehensive evaluation of the entire Learning Package. Did it teach this material as well as other methods and materials which were used before? Am I satisfied with student achievement of the objectives? Do the children like it? Did it work well overall in my classroom? Are there some unanticipated benefits? Are children learning things not specified in the objectives? Are they learning the material more rapidly than they did before the Package was introduced?

The teacher's record-keeping system for student achievement of objectives should answer some of these questions. Some schools also give standardized achievement tests which might yield some information about how well children are achieving some of the objectives. If a pre- and post-test were developed, the results of these tests should provide valuable evidence of children's learning.

For some objectives children's behavior in a variety of every day settings must be assessed. Achievement of creative thinking and problem solving objectives should be reflected in behavior at home, on the playground, and in various school activities. Checklists, completed by the teacher, children, parents, and peers, can be invaluable aids for such assessment. For example, here is a brief checklist for assessing a child's use of creative thinking abilities in a discussion situation.

_____ 1. Urges group to try to define the problem.

_____ 2. Offers information about the problem.

_____ 3. Leads group in finding facts.

_____ 4. Breaks problem down into parts.

_____ 5. Paints out constraints on solution.

_____ 6. Urges group to specify characteristics of a good solution.

_____ 7. Uses brainstorming to generate possible solution.

_____ 8. Uses evaluation to eliminate poor solutions.

_____ 9. Tests remaining hypotheses.

_____10. Reevaluates final proposed solution.

Children's attitudes concerning the Package should also be evaluated. This can be done informally in a group discussion session, as a brainstorming session in which children tell all the things they liked and disliked about it, or with a formal evaluation instrument such as the following:

1. How well did you like this Package?

☐ A lot ☐ Quite a bit ☐ A little ☐ Not at all.

2. Did you like the activities?

☐ Yes ☐ Somewhat ☐ No.

3. Which ones did you like best?

____

____

4. Which ones did you dislike?

____

____

5. Do you feel you achieved the objectives?

☐ Yes ☐ Somewhat ☐ No.

6. Were the tests and evaluation fair?

☐ Yes ☐ No

If no, why not? ____________________________

____

7. What would you do to improve this Package?

When all the evaluation information is in, the teacher must decide whether the Package is satisfactory as is, whether it needs revision, or whether it is so bad that is is necessary to start over.

If the Package seems to be successful, the next step might be to have other teachers examine it and try it in their classrooms. Will it work when your own biases, enthusiasms, and guidance are removed and neutral teachers give it to new groups of children? Packages which survive this level of evaluation can become useful instructional materials in the school for a number of years.

Developing a Learning Package is a valuable experience for the teacher. In addition to having some new instructional material to use in the classroom, the teacher will learn much about children's learning processes.

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Chapter 5

How To Organize An In-Service Program Or A Workshop

One of the best ways to get teachers interested in teaching creativity and problem solving and to give them the necessary background of information and skills is the in-service workshop. Elective courses on creativity and problem solving at colleges or universities can, of course, provide much more intensive motivation and training, but only a few teachers are likely to enroll in such courses. Thus, some alternative is needed which might be available to a large number of teachers to help them learn about teaching creative thinking and problem solving.

Workshops can be organized by principals, supervisors, or groups of teachers, but in any case there must be ample time to plan well. Since some expertise will also be needed, the leader should be a principal, teacher, or supervisor who has had training in the areas of creativity and problem solving and experience in teaching for creativity and problem solving in an elementary classroom. If no expertise is available in the school system to lead in the organization and conducting of a workshop, outside help should be sought. The education or psychology department of the nearest college or university is one likely source. A larger nearby school system might also have a supervisor or curriculum consultant who could provide the necessary expertise and leadership.

Once a leader is selected, a committee of teachers should also be organized to aid in the planning and preparation of the workshop. It would be ideal to select teachers who are already doing some things to develop creativity and problem solving in their own classrooms.

A first planning meeting can then be held. The first meeting should be devoted to discussion of instructional problems and needs in the area of creativity and problem solving, assessment of the school's resources of people and materials, and the formulation of goals or objectives for the workshop(s) or in-service sessions.

Even though a leader has been found, the group will still do well to discuss the need for a consultant to assist in planning and conducting the workshop. A careful assessment of knowledge and expertise in the group should be carried out. Then a decision can be made as to the need for outside help.

At the first or second meeting there should be some effort to define some of the critical concepts which might arise in the planning. These include:

creativity
problem solving
divergent thinking
critical thinking
discovery
questioning techniques
originality
fluency
flexibility
elaboration
inquiry
evaluative thinking

These terms are key concepts in this area, and members of the committee should be moderately familiar with all of them.

One of the early topics for committee discussion is the location and physical requirements for the workshop(s). The library, cafeteria or gymnasium are ideal places to meet since the teachers can begin the workshop as a whole group and then break down into small groups for discussion and demonstration activities. Classrooms or other small rooms can also be used for demonstrations or meetings, or even for addressing part of the large group in two sessions.

The time during which the workshop(s) will be conducted is also an important part of planning. Releasing the teachers from classroom duties for either part or all of the day is usually the best way to get maximum teacher motivation and participation. If this cannot be arranged, workshops can be offered after school, in the evening, or on off days. However, because many teachers have other responsibilities, attendance during these times will probably be very low. The date and time should be selected at least three months in advance of the time when the workshop(s). will be conducted.

Once planning is in progress and the date and time have been set, the workshop should be announced to all the teachers. The first announcement can state the preliminary plans and goals and call for ideas from other teachers to aid the planning committee. Teachers might also be invited to volunteer to demonstrate or describe some of their own current creativity or problem solving projects at the workshop(s). An inventory of instructional materials which teachers are using for teaching creativity and problem solving would also be valuable since the workshop plan, as will be suggested later, should include much demonstration of available materials which teachers have used successfully in teaching creativity and problem solving. Materials and/or procedures which teachers have developed themselves or adopted from published materials should also be included.

Specific plans for the workshop can be formulated once this information becomes available. The overall design should probably include the following events:

1) A brief creativity or problem solving exercise in which all teachers participate.
2) A presentation by the leader outlining plans for the workshop and introducing basic concepts in the area of creativity and problem solving.
3) A brief presentation of major materials and methods available for demonstration.
4) Organization of small groups at demonstration centers to examine materials and talk with teachers who demonstrate material.
5) The reassembling of the whole group to present directions for initiating a project, discuss questions with the leader, and review things they have learned.

Materials to be demonstrated can be selected from the reviews in the appendix and from suggestions received from teachers. Materials which must be secured from a publisher should be ordered at least sixty days in advance. Many publishers will send material on a loan or examination basis or on a billing basis with option to return for credit. The Appendix gives full information for ordering material which is reviewed.

Ideally copies of this complete book should be made available to all the teachers several weeks before the workshop and they should be encouraged to read it. They should bring the book to the workshop to use as a reference during the demonstrations.

When all the preliminary plans have been made, more specific planning of the content of the workshop should go forward. About one week before the date of the workshop one or two articles can be distributed to all of the teachers which set forth some basic ideas about creativity and problem solving and stimulate interest in this area of instruction. A large number of good articles have been abstracted and presented in chapter 6. The abstracts should serve as a basis for selecting articles. It should be possible to find the articles in journals in a library and make copies for the participating teachers.

As suggested earlier, the workshop should also have well stated objectives. The objectives should be written and distributed to the teachers before the workshop. You may wish to write your own objectives or choose some from the list which follows:

The objectives of the workshop are to:

1) help teachers understand basic concepts of creativity and problem solving;
2) provide some experience in creative thinking and problem solving so that teachers can better understand the processes involved;
3) give teachers a working knowledge of the book Teaching Children How to Think;
4) assist teachers in selecting published materials and methods for teaching;
5) help teachers select among various methods for teaching creativity and problem solving;
6) help teachers learn how to develop their own materials;

7) help teachers learn how to implement a project in the elementary classroom;

8) help teachers learn how to evaluate a project's success;

9) teach teachers how to integrate creativity and problem solving instruction into the daily classroom routine;

10) provide teachers with experience in evaluating published materials;

11) make teachers aware of some cautions and problems in teaching creativity and problem solving;

12) share information about and evaluations of experiences of participating teachers in their efforts to teach creativity and problem solving;

13) help teachers learn how to utilize innovative instructional materials and approaches as an integral part of classroom procedures;

14) suggest ways for teachers to measure outcomes of teaching for creativity and problem solving;

15) help teachers recognize problems of working with highly creative children in the classroom.

You may decide to use some of these objectives or write your own. Whatever you decide to do, you should be sure that the objectives are distributed to all teachers before the workshop. Objectives will also be useful to the consultants to guide them in planning for the workshop.

After you have made all of these preparations you are ready to organize the day. It would probably be desirable to have a workshop chairperson who organizes, arranges for, and administers all activities. The workshop chairperson should call the meeting to order, make announcements concerning workshop procedures, and introduce the leader or consultant. The leader can then proceed with the outline of events which were presented earlier. When small group activities are initiated, the chairperson and other teachers can serve as small group leaders.

Formal presentations, lecturing, and lengthy answers to questions should be held to a minimum. Workshops should be active, hands-on events and involve all of the teachers in learning practical skills and procedures. While there may be some value in teaching underlying theory, teachers have greatest need for proven techniques that they can use in their own classrooms. Teachers also value handouts of material which they can use.

The consultant-leader should be loaded with ideas on how to involve the workshop participants in creativity and problem solving activities. The book Creative Behavior Guidebook* by Sidney Parnes offers may exercises which could be used. Involving the teachers in an exercise at the very beginning has several advantages. It should help teachers understand the underlying processes of creativity and problem solving, and it should challenge teachers to use their own creativity. The most important effect of this exercise, however, would be to make the teachers attentive and active learners. Following the exercise the leader can present some theory and relate it to the exercise. Then the leader should present an introduction to materials and methods for teaching creativity and problem solving and introduce participants to the demonstration centers.

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*Parnes, S. J. Creative Behavior Guidebook; New York: Charles Scribners Sons, 1967.

The next step is to have teachers go to work in small groups at the demonstration centers. These centers will have to be set up in advance of the large group presentation with the material that you have received from various publishers or other sources. Once again the teachers are actively involved. The stations should be previewed by the workshop leader before teachers go to the centers. You should distribute a list of the stations announcing the starting times of each activity at the stations. Teachers' time at a center might be limited to ten to fifteen minutes. A loudspeaker can be used to suggest the time to move. It is often desirable to have teachers sign up for or select the centers they wish to visit in advance. At each center the leader can give a brief demonstration and/or description of the material or method available and then allow teachers to examine the materials and ask questions.

To save movement time it would be best to set up the centers in a large room with a large table and chairs for each center to accommodate ten to twelve teachers. The teacher or other person who leads at a center should be thoroughly familiar with the material. Ideally the teacher should have tried out the material or method in the classroom.

The number of stations and the content of each have infinite variations and depend also on how much time is available. If salespersons from publishers attend the workshop ask them to assist at a station to demonstrate their materials. It is even possible to carry out a workshop without a consultant if you have no funds and no one with sufficient expertise. Many publishers are willing to send a representative with their materials to describe and demonstrate their use for teachers. This will be particularly true in larger school systems.

At this point you are ready to decide specifically what you will have at each station. Listed below is a group of creativity stations from which you can choose. You or your teachers will have to decide which ones you would like to have, or you may want to design new ones. The first two types are probably the most important and should be included in every workshop since they are really what the workshop is all about.

The first type of learning station is concerned with published material for creativity. You can have as many stations as you have materials. You can also group them according to some classification such as grade level or subject area. At these stations the kits should be laid out for the teachers to see and examine. If audio-visual equipment such as a filmstrip projector is needed, then this should be provided and the filmstrip should be shown. Precise information on costs and procedures for ordering should be available. In selecting materials for demonstration, workshop organizers should use the reference materials given in the Appendix of this book to identify things to be included.

The second method of organizing the demonstration centers is to focus on certain organizing themes or concepts. This alternative might be used in addition to those centers for demonstrating material described above. In these stations a leader with a moderate amount of expertise makes a brief presentation, leads the group in discussion, and answers questions. Here is a list of such theme or topic centers which can be organized:

1. Fostering a Creative Climate in the Classroom. What are some things that the teacher can do in the classroom to develop a creative atmosphere?
2. Measuring Creativity. How can a teacher assess growth in the creative abilities of students?
3. Readings in Creativity. What books are available to help the teacher develop creativity in students? This manual provides a complete listing of good books.
4. Creativity and the Media. What films, filmstrips or recorded materials can the teacher use to stimulate creativity? The Appendix lists films that have been designed for this purpose. You may need to set up more than one station to accommodate all of the films.
5. Creativity and Small Groups. How can small groups of students be organized to engage in creativity and problem solving learning activities?
6. Creativity and Individualization. How can the classroom be organized for individualized learning experiences?
7. Creative Questioning. What are questioning strategies teachers can use to teach creativity, inquiry, problem solving, etc.?
8. Creativity and Discovery. What techniques can a teacher use to foster creativity, problem solving and discovery learning simultaneously?
9. Constructing Your Own Creativity Material. What are

some successful procedures for developing one's own materials?

10. Becoming a More Creative Teacher. How can you become more creative as a teacher?

After the teachers have had enough time to visit several stations, have them return to the large meeting area for a question and answer period. Teachers should be allowed to ask questions and share their thoughts on the workshop activities and experiences. The consultant-leader should then give a summary statement and point the way to follow-up activities for teachers to develop methods and procedures for teaching creativity and problem solving in their classrooms.

You may find that this is the best time for follow-up committees to be formed. These committees can be responsible for seeking out or investigating other material, finding out what teachers at other schools are doing, planning for further workshops, or developing a plan for a comprehensive program of creativity and problem solving in the school.

The final event in the workshop can be the awarding of personalized certificates of completion to everyone who has been there for the whole workshop. They should be presented by the principal, or some other school official. Another somewhat more expensive payoff would be to give each teacher a small amount of money to purchase some creativity or problem solving instructional material. This money should go only to those who have attended the whole workshop.

A final activity is to have all teachers complete an evaluation questionnaire. The questionnaire should call for teacher ratings of all aspects of the workshop and ask for suggestions for future workshops. A sample questionnaire follows:

1. Did this workshop offer ideas which will be useful to you in teaching?

   Yes No Uncertain

2. Did you learn about new methods which might be useful to you in teaching creativity or problem solving?

   Yes No Uncertain

3. Did you learn about new materials which might be useful to you?

   Yes No Uncertain

4. Were you able to get answers to any questions you might have about teaching creativity and problem solving?

   Yes No Uncertain

5. Were the demonstration centers helpful to you in learning about creativity and problem solving?

   Yes No Uncertain

6. Was the workshop well organized?

   Yes No Uncertain

7. Was the leader knowledgeable and able to present good ideas?

   Yes No Uncertain

8. Did you find the presentations interesting?

   Yes No Uncertain

9. What should be changed to make such a workshop more effective? ____________________

10. What were the major strengths or good qualities of this workshop? ______

The workshop is a proven, easy and enjoyable way of learning. It takes work, planning and preparation. It takes one individual and a committee who are very responsible and willing to put in a good deal of work to organize the workshop. However, the payoffs to teachers and children can be substantial. Hopefully the participants can become more creative teachers, and their students will become better creative thinkers and problem solvers.

Chapter 6

Summaries of Research on Creativity and Problem Solving

Research on creative thinking, problem solving, and relevant methods and materials have proliferated during the last three decades. This research has had a significant impact on teaching and school curricula. Some of the research has clarified the understanding of the psychological processes involved in creativity and problem solving; some has revealed the conditions which promote or inhibit growth in creative and problem solving abilities. Evaluation studies provide more direct evidence concerning methods, materials, and procedures for teaching creative thinking.

The ideas, instructional methods, and materials presented and reviewed in other chapters of this book are based on these research and evaluation studies. In chapter 2 some of the research on special topics related to the teaching of creativity and problem solving to disadvantaged elementary school children are reviewed. This chapter presents brief summaries of some of these research reports. Some of the reports have appeared as articles in journals and magazines. Others have been published in ERIC.

These summaries of research and evaluation studies are presented for teachers who would like to know more about the theoretical bases of the methods, materials and procedures for teaching creative thinking and problem solving. Some teachers may also wish to seek out the full reports in ERIC or in journals, to read them in greater detail.

This chapter is divided into three parts. The first presents summaries of research on methods, materials, or techniques for teaching creativity and problem solving. The second part focuses on studies which are concerned with teaching creativity or problem solving in connection with curricular areas. The final part presents summaries of research on the characteristics of creative children, the nature of problem solving skills, and the relationship of creativity, problem solving, and other abilities.

Research on Methods, Materials and Techniques

Summaries of research concerned with methods, materials or techniques for teaching creativity and problem solving are presented in this section.

Ahn, C. Y. Project ACT (A project to advance critical thinking); Project termination report. Grove City, Ohio: South-Western City School District, 1973. (ERIC Document Reproduction Service No. ED 086 945)

The goal of this project was to develop a program for the development of critical thinking skills that could be extended to all the elementary schools in a school district. The major objectives were: 1) to enhance teachers' abilities to think critically, practice teaching strategies in their classrooms to develop pupils' thinking, and develop and implement a critical thinking program, and 2) to develop critical thinking in pupils attending classes taught by teachers trained in the use of critical thinking and to help students score higher on tests measuring critical thinking skills than children in a comparison class where these skills were not stressed. The teachers of grades K-5, the principal, and the staff development teacher in the project school received in-service training in procedures for developing children's thinking skills. These procedures included the Taba Teaching Strategies Program, the Building and Applying Strategies for Initial Cognitive Skills Program, the teaching of critical reading skills, analyzing levels of thinking, and organizing for instruction. Data indicated that the children in the project school tended to make greater gains than the children in the comparison school. The teachers also asked more open questions and there was more classroom interaction exhibited.

Allender, J. S. The teaching of inquiry skills using a learning center. AV Communication Review, 1969, 17 (4), 399-409.

This study had two purposes. The first was to determine if 5th grade children could be taught to increase their inquiry activities through the use of an environment designed to teach inquiry skills. The inquiry material used was entitled "I am the Mayor." Second, the study attempted to determine whether the degree of structure in terms of teacher direction would have a significant effect on inquiry activity. Results suggested that the use of a learning center environment designed to teach inquiry skills and appropriate teacher direction can increase inquiry activity.

Ball, D. W. Brainstorming. Science and Children, 1973, 11 (4), 14-15. (ERIC Document Reproduction Service No. EJ 091 645)

This paper suggests that the technique of brainstorming, in which a group generates spontaneous thoughts regarding how something might be used or how a problem might be solved, can be used as a valuable method to help elementary school children learn science.

Baughman, M. D. Teaching early adolescents to think. Urbana, Ill.: Junior High School Association of Illinois, 1964. (ERIC Document Reproduction Service No. ED 011 967)

A series of papers dealing with the teaching of thinking to adolescents is presented in this report. Topics include 1) a review of the literature on thinking and teaching, 2) the development of independent thinking, 3) factors related to thinking readiness, 4) teaching pupils how to think, 5) relationships between emotions and thinking, 6) the role of inquiry in learning, 7) inquiry training, 8) the use of the inductive method in teaching, and 9) the influence of modern mathematics on the teaching of thought processes.

Bella Vista Elementary School. Project Implode. Igniting creative potential. Salt Lake City, Utah: Bella Vista Elementary School, 1971. (ERIC Document Reproduction Service No. ED 062 262)

This booklet was produced for teachers in the hope that the philosophy of multiple talents and productive thinking will be an aid in the development of future citizens. In the introduction Calvin W. Taylor discusses talents as the central focus in all classrooms, new tests for identifying important talents heretofore neglected, and the need of a multiple accountability system for assessing educational outcomes. Each section on divergent production, convergent production, evaluation, creativity, planning, communication, forecasting, and decision making includes guidelines for recognizing and developing talents in that area. Talent development objectives with student activities are outlined, and related curriculum activities are suggested. A lesson plan example and a bibliography are appended.

Bills, F. L. The development of divergent thinking as a function of inquiry thinking. Ed.D. Dissertation, Utah State University, 1970. (ERIC Document Reproduction Service No. ED 075 168)

This study evaluated an attempt to increase the divergent thinking of 8th grade students with a 5 week experimental treatment utilizing student inquiry. In this treatment, students were shown a demonstration consisting of a discrepant event. Students then suggested hypotheses and checked their hypotheses by asking questions, as in Suchman's method. Instructors answered these questions but did not identify the correct explanation. Six teachers each taught 1 experimental class and 1 control class, for a total of 306 students. Six creativity tests were given before and after the treatment. It was concluded that, although students appeared to enjoy the inquiry sessions and were motivated to seek solutions from outside sources when discussions were left open-minded, the experimental treatment did not increase their creative production.

Bouchard, T. J. Whatever happened to brainstorming? *The Journal of Creative Behavior*, 1971, *5* (3), 182-189.

After reviewing the rules of brainstorming, the author cites research which found that individuals working alone produce more unique ideas than a brainstorming group. Several reasons why the conclusion that brainstorming is ineffective are considered. Experiments designed to account for these considerations yielded several findings. Groups operating in a sequential participation manner were more effective than groups participating spontaneously. Group composition, training of members, and interpersonal effectiveness also had an effect on the group results. Further experimentation found that groups using the sequential participation technique of brainstorming did not do as well as those using "personal analogy" techniques from synectics along with sequential brainstorming.

Cornish, R. L. (Ed.) *Classroom activities to develop creativity*. Fayetteville, Ark.: Arkansas University. (ERIC Document Reproduction Service No. ED 081 [illegible]89)

A vitally important objective for the classroom teacher is to foster children's creative thinking. In this activity book for teachers of young children, the need for independence and creativity in modern society is discussed as an antidote for the conformity and depersonalization characteristic of our culture. Teacher flexibility and acceptance of children are noted as the crucial determinants of a classroom atmosphere that promotes creativity.

The teacher concerned with creativity attempts to set up problem situations for the children for which there is no one correct response, so that students can independently try out different solutions. The manual is divided into 11 sections, each of which suggests activities to stimulate abilities that a creative individual might possess. Classroom activities designed to enhance each of these abilities are included for each selection.

Covington, M. V. Productive thinking and a cognitive curriculum. Paper presented at the annual convention of the American Psychological Association, Washington, D. C., September, 1967.

This paper is a description of a process-oriented cognitive curriculum designed to foster intellectual processes. A discussion of long-range educational goals, a description of pedagogical techniques, and an explanation of social, educational and psychological justifications are included. The Creative Thinking Project which was developed at the University of California at Berkeley is based on the cognitive curriculum model. It emphasizes mental skills, strategies, and attitudes such as incubation, intuition, idea generation, question asking and reflection. It also includes information dealing with cause and effect, evidence and proof, and objectivity. Mental operations are taught as a curriculum to help students learn to think. Programmed lessons which form the General Problem Solving Program, designed for upper elementary students, instruct students in cognitive operations which are fundamental to effective problem solving. This program, tried out with 1000 students, appeared to strengthen students' desire to solve problems and make them more productive solvers.

Covington, M. V., & Crutchfield, R. S. Facilitation of creative problem solving. Unpublished manuscript.

This article reports research which emphasized the improvement of skills and strategies in problem solving. A 13-lesson program consisting of detective and mystery stories was used with 98 5th and 6th grade students. The stories were printed cartoon style and were written so that the children could use clues and information to discover the solution of the mystery themselves. Results showed that children instructed with the program were able to provide significantly more solutions to test problems than non-instructed children could provide; their superiority was still found 5 months later. With an expanded program and increased testing for problem-solving ability, a second study researched 4 conditions of the situation with 286 children. Again instructed children showed better ability to problem-solve.

Cox, M. H. Creative teaching: An unusual combination of the commonplace. Minnesota Journal of Education, 1966, , 26-27.

Defining creativity as the changing of the commonplace to the unusual, the author suggests that there has been an overemphasis on IQ and achievement. Creativity can be encouraged by creative teaching which allows students to gain new insights from manipulation of materials. The author suggests 3 activities which encourage or require creative expression. Creative dramatics, such as acting out nursery rhymes, gives experiences of moving, acting, and speaking creatively. Puppetry, which can add interest to reading assignments or present social studies lessons, requires creativity in producing staging and sound effects, making the puppets, creating scenery and properties, and writing the script. Poetry writing also encourages creativity and allows young poets to use imagination while learning to be interpreters of life.

Davis, G. A. (Ed.) A program for training creative thinking: I. Preliminary field test. Madison, Wis.: University of Wisconsin, 1969. (ERIC Document Reproduction Service No. ED 036 019)

A program designed to develop the creative potential of 6th, 7th, and 8th grade students, it incorporates ideas from a 3-part model which conceptualizes the components of creativity as appropriate creative attitudes, various cognitive abilities, and idea-generating techniques. It attempts to increase students' awareness of, and appreciation for, change and innovation; provide exercises for creative abilities which facilitate the fluent production of original ideas; teach techniques for the systematic production of new idea combinations; and, through humor, to create a free atmosphere encouraging spontaneity and imagination. In a preliminary field test, responses to an attitude questionnaire and 3 divergent production tasks showed the program to be effective. There was also an indication that the trained subjects acquired more creative attitudes, including confidence in their own creative ability, than the control subjects.

Davis, G. A., Houtman, S. E., Warren, T. F., Roweton, W. E., Mari, S., & Belcher, T. L. A program for training creative thinking: Inner City evaluation. Madison, Wis.: University of Wisconsin, 1972. (ERIC Document Reproduction Service No. ED 070 809)

The effectiveness of a workbook for training creative thinking, "Thinking Creatively: A Guide to Training Imagination," was evaluated with a sample of inner-city students. The materials teach attitudes which predispose an individual to behave more creatively and techniques for producing new combinations of ideas. Two

6th-grade and 2 8th-grade classes served as experimental groups; 4 similar classes comprised the control groups. A pre-test was given using 3 subtests from the Torrance Tests of Creative Thinking. Another form of the Torrance Test was administered after 4 weeks of training. A 20-item attitude questionnaire was given to all subjects; 2 other instruments were given to the experimental groups. Most students and teachers felt that the creativity training experience had been beneficial. Two experimental classes showed modest gains in the Torrance Test Series.

Dull, L. W. (Ed.) Teaching critical thinking in the secondary school. Columbus, Ohio: Ohio Education Association, 1964. (ERIC Document Reproduction Service No. ED 013 687)

The book presents methods, procedures, and techniques for teaching critical thinking in junior and senior high school. Critical thinking and problem solving, used synonymously, are defined as suspension of judgment in problem solution. Necessary factors cited in the process are 1) mastery of sub-skills, 2) correct classroom climate, 3) independent study, and 4) group cooperation. Intelligent questioning is seen as a part of good teaching. To emphasize this concept sample questions are presented, aimed at providing help in the following areas: 1) setting the stage for learning, 2) calling up mental images, 3) clarifying significant details, 4) bringing out the "whys," 5) highlighting important ideas, and 6) helping students consolidate ideas and apply new understandings. Further discussion includes teacher role and responsibilities in dealing with controversial issues, an outline of the steps and skills in critical thinking, an observation record of critical thinking, recommendations for brainstorming, and an evaluation method for critical thinking. Attention is devoted to specific techniques and suggestions for teaching critical thinking in the English program, the social and physical sciences, mathematics, and the arts. A brief bibliography is included.

Dunn, L. M. (Ed.) *The effectiveness of the Peabody Language Development Kits and the Initial Teaching Alphabet with disadvantaged children in the primary grades: A report after the third grade of the Cooperative Language Development Project*. Nashville, Tenn.: George Peabody College for Teachers, 1968. (ERIC Document Reproduction Service No. ED 043 723)

The purpose of this project was to examine the effects of an oral language development program and an experimental reading program in improving the academic achievement, language development, intellectual functioning, and creative thinking of disadvantaged children in primary grades. The experimental treatments were 1) an oral language program consisting of experimental versions of the Peabody Language Development Kits and 2) an experimental reading (Initial Teaching Alphabet) approach. A control group used a conventional basal reading program. The 2 experimental approaches in combination appeared to be the most effective treatment for improving the intellectual and language development as well as the school achievement and creative thinking of disadvantaged children. Exposure to the experimental reading and language development programs had a number of beneficial effects.

Feldhusen, J. F., Treffinger, D. J., & Thomas, S. J. Global and componential evaluation of creativity instructional materials. *Monograph of the Creative Education Foundation*, 1971.

The purpose of the research reported here was to evaluate the 3 components--stories, presentations, and tapes--of the Purdue Creativity Training Program, which consists of 28 audio tapes and printed exercises. Subjects were 4th-, 5th-, and 6th-grade students who were assigned to 8 experimental treatments. Results demonstrated that the complete PCTP, individual components, and combinations of components facilitated development of students' divergent thinking abilities. The exercises seemed to be the most effective components, while the presentations were least effective. Combinations of 2 components were more effective than the complete program, but rarely more effective than 1 component. The program appeared to be more effective for 4th and 5th graders than for 6th graders.

Flynn, L. Yesterday's minds or tomorrow's? A handbook on creativity. Cheyenne, Wyo.: Cheyenne Public Schools. (ERIC Document Reproduction Service No. ED 051 158)

This report focuses on grades K-8, with emphasis on the lower grades. The greater part of the guide is concerned with the identification and encouragement of creativity. Chapter headings include: Definitions of Creativity; The Creative Teacher; What is the Creative Child Like?; and Methods of Measuring Creativity. The guide is mimeographed and spiral bound with a soft cover. Specific activities are listed for art, language arts, mathematics, physical education, and social studies. There is a brief bibliography included.

Freiheit, S. G. The effects of a training program upon the creative performance of fourth grade children: Report from the project on task and training variables in human problem solving and creative thinking. Madison, Wis.: University of Wisconsin, 1969. (ERIC Document Reproduction Service No. ED 036 045)

The purpose of this project was to determine if use of a creativity training workbook (Stretch) would increase creative performance of 4th-grade pupils. The students were divided into control and experimental groups with half high and half normal ability. The controls used a placebo workbook and the experimentals used the Stretch workbook. Pre- and posttesting with the Torrance Tests of Creative Thinking revealed no significant differences between the 2 groups. However, the author felt that Stretch did improve verbal originality. Certain scores of the lower ability groups improved more than the higher ability groups, and all students improved significantly on almost all measures. The author concluded that the workbook has the potential to be helpful in creativity training.

Granowsky, A., & Botel, M. Creative thinking, reading and writing in the classroom. *Elementary English*, 1974, *51*, 653-654.

Suggesting that all children are able to be creative although creativity has been stifled in some, the author suggests 5 ways to nurture creativity in the classroom. Children should be encouraged to recognize alternate solutions in life in order to recognize that variable outcomes are possible. Story-endings should be emphasized as choices of the author and not the only possibilities. A psychologically secure environment should be maintained so that the teacher can be supportive of creative effort. Experience and skill in subject areas should be emphasized and teachers should strive to provide models students can understand. Finally, creative effort should be rewarded.

Gregory, T. B. *Teaching for problem-solving: A teaching laboratory manual*. (Preliminary Edition.) Austin, Tex.: Texas University, 1970. (ERIC Document Reproduction Service No. ED 046 905)

This manual provides a set of tasks for the micro-teaching context of a teaching laboratory to be used in teaching pupils an approach to problem solving. The introduction describes the content and functioning of the teaching laboratory and the way in which the manual should be used. Details of 5 lessons are given. In the descriptions of each lesson, the instructional objectives and methods are detailed, and an evaluation guide and listening guide are also included.

Hallman, R. J. Techniques of creative teaching. _The Journal of Creative Behavior_, 1967, _1_ (3), 325-330.

From literature dealing with creativity the author has identified some obstacles which inhibit creative expression. Pressure to conform and succeed, authoritarian attitudes and environments, ridicule, and rigidity of personality are some obstacles. Other obstacles are over-emphasis on rewards, a quest for certainty, hostility toward the divergent personality, and intolerance of the "play" attitude. Teachers can guard against the presence of these obstacles in their classrooms by following some techniques which are effective for eliciting creative responses. They may provide self-initiated learning experiences, a non-authoritarian learning environment, and opportunities for students to manipulate materials, ideas, and concepts. They can encourage over-learning, defer judgment, promote intellectual flexibility, encourage self-evaluation, use effective questioning, and encourage student use of creative thought processes.

Lundsteen, S. W. Questioning to develop creative problem solving. _Elementary English_, 1974, _51_, 645-650.

The author describes group discussions for problem solving in grades 1-6, and she suggests methods for teachers to use. Methods discussed include open-ended questioning, encouraging divergent thinking, and encouraging open discussion. Examples of the methods are provided.

Mann, J. S. *An application of a model of creative thinking to teaching in a first-grade classroom*. Madison, Wis.: University of Wisconsin, 1966. (ERIC Document Reproduction Service No. ED 010 255)

The effects of 2 techniques for teaching children's literature to samples of 1st-grade children were investigated. The experimental treatment was based on Lawrence Kubie's model of creative process. The control group received the conventional presentation of children's literature without Kubie's emphasis on metaphorical and preconscious symbolism. The hypotheses tested were that the experimental group would perform better than the control group on measures of fluency, flexibility, originality, recall, and analogy-making. The groups did not differ significantly, but the author stated that the data supported the need for further investigation.

McClerren, B. F. Creative teaching. *The Speech Teacher*, 1966, *15* (3), 212-216.

Four categories of definition of creativity are listed along with clarification of those most relevant to speaking. Creative methods for teaching speech are discussed. Topics for speeches, ideas for introducing speech topics, discussion suggestions, and activity ideas are outlined. Benefits resulting from the creative approach to teaching, such as understanding the value of self-direction, learning the value of curiosity and inquiry, and the attainment of self-realization, are discussed.

Mitchell, B. The classroom pursuit of creativity: One strategy that worked. *Journal of Research & Development in Education*, 1971, *4* (3), 57-62.

This article reports an in-service program to teach creative skills that was developed in California schools. The goal of the creativity project was to develop teaching strategies which would increase the creative thinking abilities of elementary students. The overall strategy for the program involved 3 phases: 1) emphasis was placed on creativity as a psychological process; 2) the concept of creativity was moved to a more personalized and emotionalized concept; and 3) there was a gradual reintroduction of phase 1, so that the 2 phases were combined gradually. Results suggest that in-service projects of this nature are capable of producing changes in the direction of increased openness.

Nelson, L. N. Maximizing creativity in the classroom. Young Children, 1966, 21 (3), 131-136.

This article considers the conditions which foster originality, spontaneity, and imagination in early childhood. The psychological climate of the classroom, the social climate of the classroom, the organization of the school, and the instructional program influence a child's attitudes toward life and school tasks. Teachers can foster the development of creativity by providing 1) time, space, and a social-emotional climate that encourages curiosity, spontaneity, and imagination; 2) guidance and permissiveness; 3) praise, questions, and clarification to move the child to insight in creative thinking; and 4) a variety of resources in literature, music, and art to provide the child with rich sensory experiences.

Olton, R. M. (Ed.) The development of productive thinking skills in fifth-grade children. Madison, Wis.: University of Wisconsin, 1967. (ERIC Document Reproduction Service No. ED 021 312)

This study investigated the extent to which thinking and problem solving of 5th-grade students could be improved by the use of self-instructional programmed lessons (the Productive Thinking Program), the relationship between productive thinking abilities and IQ-sex characteristics of the learner, and the relationship between level of productive thinking performance and the extent to which overall classroom environment was judged to facilitate creative thinking. Results showed significant increases in thinking and problem-solving performance on a wide variety of productive thinking measures. These instructional benefits occurred for virtually all types of students, regardless of sex or general IQ level, and were especially marked for students in classrooms having environments which were judged to provide relatively little support and encouragement for the development of productive thinking. Performance on the productive thinking measures used in this study was significantly related to sex (girls generally scored higher than boys) and showed a strong and positive relation to IQ.

Parnes, S., & Meadow, A. Evaluation of persistence of effects produced by a creative problem-solving course. Psychological Reports, 1960, 7, 357-361.

In order to evaluate the long-range effects produced by a creative problem-solving course, 2 groups of 24 subjects were studied. Students in the experimental group had completed the course at least 8 months before testing; the control group had not taken the course. The groups were matched for vocabulary ability and tested with 6 creativity tests. Results showed that the experimental group did better than the control group on all measures, indicating that increased creative thinking productivity had persisted for 8 months or more after the creative problem-solving course was completed.

Scheinfeld, D. R., & Parker, M. *The Sharper Minds Program: Group problem-solving for the disadvantaged.* Chicago, Ill.: Institute for Juvenile Research, 1969. (ERIC Document Reproduction Service No. ED 034 827)

This report describes a group problem-solving approach to educating disadvantaged elementary school children. It is suggested that aggressive verbal exchange and active solution to real-life problems are potent tools for helping disadvantaged students become active learners and creative participants in society. Methods for conducting such a group following the so-called Sharper Minds Program are described, along with suggestions for kinds of problems to be used.

Scholl, S. The cultivation of creativity. *Peabody Journal of Education*, 1967, *44* (5), 282-285.

This article discusses the apparent lack of creativity in the present educational system. The author explains the relationship between technique and creativity; whereas it is necessary to know some technique to be creative, pure technique is not sufficient for creative expression. The educational system strives to teach only technique. The importance of allowing time for creative thought and of teaching aspects of a subject that interest creative people is also presented.

Scott, J. A., & Frayec, D. A. *Learning by discovery: A review of the research methodology* (Working Paper No. 64). Madison, Wis.: Center for Cognitive Learning, 1970.

A review of the research on discovery learning, with focus on the methodology of each study, was presented in this paper. The effects of discovery methods on initial learning, transfer, and retention are discussed. The use of a standardized concept learning task was recommended for future research dealing with discovery methods of presentation.

Shapiro, P. P., & Hunkins, F. P. Critical thinking: The case method. The Catholic Educator, 1970, April-June, 41-43.

This paper discusses critical thinking in the classroom. Critical thinking involves a much more active student engagement than traditional class activities do. It requires 1) stating the problem to be solved, 2) making suggestions as to what might be done, 3) gathering information by the student according to the suggestions made, 4) checking the original suggestions against the facts, and 5) testing the suggestions. Two sample lessons are included in the article.

Shively, J. E., Feldhusen, J. F., and Treffinger, D. J. Developing creativity and related attitudes. Journal of Experimental Education, 41, 1972.

Fifth-grade teachers and pupils served as subjects in experimental classes. The Torrance Tests of Creative Thinking were used as pretests and posttests and the Childhood Inventory for Problem Solving was given as a posttest. Eight of the experimental classes used the Purdue Creative Thinking Program and 8 used the Productive Thinking Program. Eight teachers used relevant discussion; 8 did not; 8 teachers were high and 8 low in creative ability. Pupils in all conditions made significant gains on verbal and nonverbal originality and nonverbal fluency. Teachers who were low in creative ability had lower means.

Skinner, B. The myth of teaching for critical thinking. The Clearing House, 1971, 45 (6), 372-376.

This article discusses the nature and definition of critical thinking. The author suggests that the steps for critical thinking are the following: 1) recognizing a problem, 2) formulating a hypothesis, 3) gathering pertinent facts or data, 4) testing the hypothesis, and 5) drawing conclusions. Techniques for developing critical thinking are presented and evaluated. Teachers should encourage students to approach a subject using the given steps for critical thinking.

Stern, C. Children's use of knowledge of results in thinking. Los Angeles, Calif.: University of California, 1966. (ERIC Document Reproduction Service No. ED 010 035)

A series of experiments was designed to study the value of teaching children a multiple hypothesis strategy. Third-grade children were divided into 3 groups--those taught the multiple hypothesis strategy, those taught to select a hypothesis and stick with it until proven wrong (single hypothesis strategy), and those given no strategy instruction with and without opportunity for practice. Evidence indicated that instruction in problem-solving strategies was superior to unguided discovery.

Thomas, G. I., and Crescimbeni, J. Developing increased creativity with children. Education, 1967, 87 (5), 271-276.

Emphasizing that today's students need to be educated for flexibility and adjustment to change, independence, and creativity, the authors suggest that the teacher must meet great demands. A broad curriculum which challenges students to think clearly and creatively must be maintained, but new approaches and materials will be needed. The teacher must know the community the school serves, be able to withstand criticism, and be creative. By providing for learning according to individual differences, the teacher must make more efficient use of teaching and learning time.

Torrance, E. P., & Gupta, R. Development and evaluation of recorded programmed experiences in creative thinking in the fourth grade. Minneapolis, Minn.: University of Minnesota, 1964. (ERIC Document Reproduction Service No. ED 003 612)

This project investigated 2 problems related to the development of creative thinking abilities at the 4th-grade level: 1) the difficulties teachers experience in encouraging and guiding creative experiences in the classroom and relating them to curricular content and 2) the development of ways for counteracting the numerous influences which bring about a slump in creative thinking abilities, motivations, and activities at about the 4th-grade level. Subjects of the study included 4th-grade classes from 3 states. Teachers in the project experimental groups agreed to use experimental audiotapes, and those in the control groups were instructed to use conventional instruction. Before the experimental materials were introduced, a number of assessment devices were administered to participating students. Near the end of the school term and upon completion of the experimental program, all classes were readministered the creativity assessment devices. The evidence was in favor of the experimental procedures.

Treffinger, D. J., & Ripple, R. E. *The effects of programmed instruction in productive thinking on verbal creativity and problem solving among elementary school pupils*. Ithaca, N. Y.: Cornell University, 1968. (ERIC Document Reproduction Service No. ED 030-156)

The effectiveness of the Productive Thinking Program in developing creative thinking and problem solving abilities among pupils in grades 4-7 was examined. An exploratory investigation of the program's instructional content was also undertaken. At all 4 grade levels, instructed pupils' scores on Covington's Childhood Attitude Inventory for Problem Solving were significantly greater than those of controls.

Treffinger, D. J., Speedie, S. M., Bruner, W. D. Improving children's creative problem solving ability: The Purdue Creativity Project. The Journal of Creative Behavior, 1974, 8 (1), 20-29.

Research reported here evaluated the effectiveness of the Purdue Creative Thinking Program (PCTP) and the Productive Thinking Program (PTP) as self-instructional materials and as teacher-participation materials. Two conditions of instruction, massed and distributed, were assessed. Two types of teachers, low and high in creative thinking ability, were examined. Subjects were 793 5th-grade students and 36 teachers. Pre-testing was done using the Torrance Test of Creative Thinking. Results showed that the programs increased students' divergent thinking and creative problem solving. Massed presentation yielded superior student performance when self-instructional programs were used by lowly divergent teachers. The PCTP was most effective with distributed practice when a highly-divergent teacher participated in discussion.

Verbeke, M. G., & Verbeke, K. A. Discovery and inquiry: Their relevance as approaches for teaching the gifted. Pitman, N. J.: Educational Improvement Center, 1972. (ERIC Document Reproduction Service No. ED 062 744)

The educational techniques of discovery and inquiry learning and their relevance to the education of academically gifted children are discussed. Following discussion of various definitions of discovery and inquiry, the 2 terms are dealt with synonymously to avoid confusion. Brief historical background is given on the growth of discovery and inquiry as educational techniques. The relationship of these teaching approaches to theory and the rationale for implementing such techniques in the education of the gifted are examined. Application of the methods in the classroom is considered in terms of the characteristics which must be present in the classroom and learning environment, tools and materials which facilitate the approach, and teacher functions. Recent research concerning the 2 teaching methods is reviewed. Some current programs that use the discovery-inquiry approach are listed.

Warren, T. F. Creative thinking techniques: Four methods of stimulating original ideas in sixth grade students. Report from the task and training variables in human problem solving and creative thinking project. Madison, Wis.: University of Wisconsin, 1971. (ERIC Document Reproduction Service No. ED 057 406)

This dissertation reviews the literature on creative behavior and reports a study exploring the operational approach to creativity. Sixth-grade students were assigned randomly to 6 treatment levels. The subjects in 4 levels read booklets which described principles of creative thinking techniques and which presented examples and exercises. One group read a control booklet, while another read no booklet. All subjects then completed 3 creativity tests and an attitude inventory. A difference among treatment levels as a function of the playfulness or organizational emphasis of the various techniques was predicted. The more playful techniques were expected to produce higher scores on measures of flexibility, originality, and best ideas. The more organized techniques were expected to produce higher scores on fluency. No treatment differences were found, however, for any of the measures, nor were there differences in the treatment by sex or treatment by school interactions.

Weber, W. A. Relationships between teacher behavior and pupil creativity in the elementary school. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, February, 1968. (ERIC Document Reproduction Service No. ED 028 150)

A 4-year study was conducted to test the hypothesis that indirect teacher behaviors foster pupil creativity more than do direct teacher behaviors. Scores derived from interaction analysis data were used to classify elementary school students as having experienced 1 of 4 teaching behavior combinations: indirect or direct all 4 years, indirect for 3 years and direct in the 4th year, and direct with indirect in the 4th year. Results suggest that verbal creativity is fostered more under the influence of indirect teacher behaviors, and that figural creative potentialities are encouraged more under the influence of consistent patterns of teaching behaviors. It would seem that consistently indirect teaching behavior would encourage the growth of both verbal and figural expression.

Creativity in Curricular Areas

The following studies are concerned with teaching creativity or problem solving in particular curricular areas.

Aiken, L. R., Jr. *Ability and creativity in mathematics.* Columbus, Ohio: ERIC Information Analysis Center for Science, Mathematics, and Environmental Education, 1973. (ERIC Document Reproduction Service No. ED 077 730)

The relationships of intelligence, achievement, sex, age, heredity and psychological factors to mathematical creativity are reviewed and discussed in this document. A bibliography listing 125 references is included.

Allen, R. F., Fleckenstein, J. V., & Lyon, P. M. *Inquiry in the Social Studies.* Washington, D. C.: National Council for the Social Studies, 1968.

This bulletin contains a collection of social studies readings on the inquiry method of teaching. Articles define and clarify inquiry as an effective approach to learning social studies. Theory, rationale, models for classroom inquiry, and examples of classroom use are discussed. The materials are designed for use by pre-service and in-service teachers.

Butts, D. P., & Jones, H. L. Inquiry training and problem solving in elementary school children. *Journal of Research in Science Teaching*, 4 (1), 1966. (ERIC Document Reproduction Service No. ED 010 995)

The effect of planned guidance on the problem-solving behavior of elementary students was investigated. Factors related to changes in problem-solving behaviors were identified. Approximately 50% of the 6th-grade students included in the study were given inquiry training. An inventory of science processes was constructed for the study. Students were pretested and posttested for knowledge of science and ability to use the processes related to problem-solving in science. Other data were obtained from student records. There was a significant relationship between inquiry training and changes in the problem-solving behaviors of students, but no significant relationship between inquiry training and concept transfer or changes in recall of factual knowledge. Other analyses indicated no relationship between measured intelligence, chronological age, science factual knowledge, or sex and change in problem-solving behaviors that occur in conjunction with inquiry training.

Covey, B. L. *Teaching gifted students English usage in grades seven through nine*. Sacramento, Calif.: California State Department of Education, 1970. (ERIC Document Reproduction Service No. ED 051 606)

Intended to assist English teachers of junior high gifted students whose mental ability is in the top 2% of all students, the publication explores certain aspects of the California English curriculum and identifies possible directions in English instruction which emphasize the process of inquiry. Both techniques and content in the study of English usage are examined. Increasing the relevance of course content is seen to be possible through thematic or generic structuring of content based on significant works of literature and by concern with communication in all its forms and via all media. Discovery methods similar to those used in newer physical science courses are recommended, as are communications or media laboratories, for promoting an inductive study of language in all its forms of communication and for relating course content to the needs of gifted students and to the development of high-level skills.

Dakeman, B. C. Think tank and mind transportation: Teaching creative writing. *English Journal*, 1973, 62 (9), 1272-1273.

The author discusses the use of "mind transportation" and the "Think Tank" for teaching creative writing. She has found mind transportation to be a highly effective method. In this method, the teacher supplies the students with an absurd or mind-tickling question on which the students write. One of the most interesting techniques the author feels she has used is the Think Tank. The room is darkened, scented candles lit, relaxing music played, and students are free to think and write on any topic they desire.

Gross, R. E., & Muessig, R. H. (Eds.) *Problem-centered social studies instruction*. Washington, D. C.: National Council for the Social Studies, 1971. (ERIC Document Reproduction Service No. ED 051 058)

The plea of this bulletin is for teachers to do more with reflective thinking in their classrooms. It draws upon the latest and most pertinent insights distilled from research, theory, and practice associated with reflective thinking. It deals with the specific what's, why's, how's, and when's of problem solving in social studies at the elementary and secondary school levels, and makes a case for increased use of this inquiry method and type of program organization. Specific suggestions are offered that range from the question-answering stage to full-fledged problem-solving units.

Karioth, J. Creative dramatics as aid in developing creative thinking abilities. *The Speech Teacher*, 1970, *19* (1), 301-309.

This experimental study was conducted to ascertain whether a 7-week program in pantomime, improvisation, and other creative dramatics would improve general creative thinking. Subjects were

4th graders from low income urban areas of Minneapolis. Creativity was measured by the Torrance Tests of Creative Thinking in pretest and posttest situations. Results indicated some degree of significant increase in creativity scores after the program.

Labinowich, E. In how many different ways . . .: Divergent questions as springboards for "opening" your classroom. *Science and Children*, 1973, *11* (2), 18-20. (ERIC Document Reproduction Service No. EJ 088 316)

This article discusses the use of divergent questioning in the science classroom. This form of questioning is open-ended and encourages children to contribute to class discussion with a variety of responses.

Lafayette, R. C. *Creativity in the foreign language classroom.* Paper presented at the West Virginia Foreign Language Conference, Huntington, W. Va., 1973. (ERIC Document Reproduction Service No. ED 081 274)

Several definitions of the concept of "creativity" are examined in the introductory remarks of this article concerning foreign language instruction. Selected examples of innovational approaches to "creative" foreign language teaching are presented and underscore the belief that creative instruction resides in the ability of the instructor to produce or bring about an atmosphere where students have unlimited opportunity to create "real" language. The article concludes with a plea to teachers to personalize their instruction and thereby move toward a more creative and meaningful learning situation.

Laxier, G. Dramatic improvisation as English teaching methodology. *The English Record*, 1969, *20*, 46-51. (ERIC Document Reproduction Service No. ED 035 650)

Over a period of months, illiterate and disruptive black and Puerto Rican junior high school students in New York City developed and staged an updated version of "West Side Story." Although by professional standards the results were poor, students were able to participate in a highly rewarding activity which demanded discipline, creativity and teamwork. By being encouraged to improvise on the original story line, illiterate children were motivated to express themselves verbally, to communicate with their audience, and to contribute their own experiences toward realizing the characters. Because this approach has many classroom possibilities, even for teaching grammar and history, units on utilizing improvisation should be included in English methods courses. Although improvisation is not a teaching panacea which will erase students' learning and behavior problems, it at least conveys the message that school can be fun.

Meyer, R. W. The identification and encouragement of mathematical creativity in first grade students. (Tech. Rep. 112) Wisconsin Research and Development Center for Cognitive Learning. Madison, Wisconsin, January, 1970.

This report describes research which led to the formation of 6 criteria of observable aspects of mathematical creativity. These criteria are described and discussed and a program designed to encourage individual mathematical creativity is described. Also reported is a testing instrument based on the 6 criteria. This instrument was used to assess the pilot program. The author feels the instrument is the major contribution of this research.

Schisgall, J. The creative use of multimedia (or the shape of strings to come). Teaching Exceptional Children, 1973, Summer, 163-169.

From her experiences with teaching a nonelective drama lab to 6th-12th-grade students, most of whom have social and academic difficulty, the author suggests creative activities for students. Many can be used well with elementary students. She suggests that students be allowed to play in the light of an overhead projector in a darkened room to experiment with body shapes and silhouettes. Other suggestions she makes involve movie projectors--without sound or music--filmstrips and music. Fun games can be played with long strings, homemade rose-colored glasses, dress-ups and hats, and collections of objects in paper bags.

Scott, N. C., Jr., & Sigel, I. E. *Effects of inquiry training in physical science on creativity and cognitive styles of elementary school children*. Detroit, Mich.: Merrill Palmer Inst., 1965. (ERIC Document Reproduction Service No. ED 003 700)

An inquiry approach to learning was subjected to a rigorous test and evaluation program, involving elementary instruction in the physical sciences. Students in the 4th, 5th, and 6th grades served as subjects. Evaluative criteria were 1) science concept achievement, 2) divergent thinking or creativity, and 3) cognitive styles. In addition, efforts were made to detect sex differences and cognitive developmental trends. A group taught by conventional methods served as a control. Only in the cognitive style tasks did the inquiry approach show significant effects on conceptual activities. The inquiry process appeared generally to encourage and develop an exploratory attitude on the part of the individual learner which led him beyond basic, overt perception. Inquiry groups in grade 5 achieved science concepts better than children taught by conventional means, but the 2 groups in other grades showed little difference in science concept achievement. Little difference in creative thinking was evidenced but the inquiry children were more flexible in their classification behavior and more attentive to detail in problem situations. Overall in the 3 grades boys showed greater variability than girls in their attention to detail and use of classifying labels.

Shapiro, P. P., & Shapiro, B. J. An evaluation of poetry lessons with children from less advantaged backgrounds. Paper presented at the Annual Meeting of the American Educational Research Association, New York, February 1971. (ERIC Document Reproduction Service No. ED 047 040)

A recent study by the authors showed that 4th graders from an upper middle class background with varying degrees of intelligence, creativity, and language achievement could be taught to express themselves poetically. The present study was undertaken to replicate these results with children from less advantaged backgrounds. The 2 alternative experimental programs for poetry writing developed for the initial study were used. Comparison of these results indicate that the methodologies employed are equally effective with both socio-economic groups. The effect of intelligence, creativity, and language development differs to some extent. The implications of both similarities and differences are explored.

Sommers, W. S. Developing creative thinking abilities. American Council on Industrial Arts Teacher Education, 1965, 14, 73-83.

The purpose of this article is to provide understanding of the improvement of creative thinking skills through deliberate effort. The creative learning activities of 2 studies by Sommers and Anderson are presented. The implications of the results of the study for use in the industrial arts classroom are discussed. Suggested references for further reading on creative teaching are given.

Strain, L. B. Inquiry and social studies for disadvantaged learners. *The Social Studies*, 1970, *LXI* (4), 147-149.

This study discusses the use of inquiry methods in the social studies classroom with disadvantaged learners. Disadvantaged children need to physically manipulate an object in order to determine the effectiveness of their performance. Inquiry requires that the learners become involved at their own levels of concerns. This need for disadvantaged students to use physical manipulation and the requirement that learners become actively involved in the inquiry process can be used positively to help children learn. Teaching aids should become sources for testing ideas instead of the children merely watching, listening to, or memorizing things.

Struthers, J. A. *Developing creative and critical thinking through an elementary science program; final report*. Boulder Colo.: Boulder Valley School District RE-2, 1969. (ERIC Document Reproduction Service No. ED 056 853)

Reported is a variety of studies associated with the development of new elementary science programs. Three approaches to elementary science were given field trials, one using textbooks based on a conceptual schemes approach, one based on the Elementary Science Study materials, and the other based on "Science--A Process Approach." Tests were developed to measure changes in childrens' critical and creative thinking, and a classroom observation system was developed to categorize teaching styles as expository, inductive, or indeterminate. In a later phase of the project, teachers were given a choice of a textbook-based or non-textbook course. Data are reported bearing on the effects of curriculum materials, teaching styles, type of course chosen by the teachers, and on changes in student critical and creative thinking. The non-textbook course favored creative thinking. Also reported is a study of the effect of different instructional methods for developing the concept of conservation at the 1st-grade level.

Uhlhorn, K. W. The challenge of inquiry teaching in science. Contemporary Education, 1971, 5, 238-240.

Inquiry teaching is characterized by these philosophies: understanding occurs after meaningful experiences; learning is directed and controlled by the learner; process of science should be emphasized rather than content; process skills should be developed through investigative procedures; a stimulating environment which will sustain productive inquiry and maintain direct student involvement is needed. The child is described as an observer who forms questions and problems in response to observations. Aided by an environment which provides materials for answering questions, the child seeks information in response to a desire to know. The inquiry teacher should be a creative planner who adapts the regular curriculum into inquiry format without losing student interest. The teacher must predict the resource materials students will need in order to answer questions. The teacher must be a patient question-answerer and motivator.

Theoretical Studies

The final section presents summaries of studies on the characteristics of creative children, the nature of problem-solving skills, and the relationship of creativity, problem solving, intelligence, teacher characteristics, and other abilities.

Allender, J. S. Some determinants of inquiry activity in elementary school children. *Journal of Educational Psychology*, 1970, *61* (3), 220-225.

This research project was designed to discover if inquiry scores increase with grade level. Third to 7th grade students were used. The study was cross-sectional and used materials that simulated the work of a mayor. The materials used for measurement required problem-solving abilities. A general increase in inquiry scores was found with 3rd graders having the highest scores.

Bashaw, W. L., & White, W. F. Figural creativity and convergent thinking among culturally deprived kindergarten children. Paper presented at the American Educational Research Association Convention, New York, 1971. (ERIC Document Reproduction Service No. ED 047 346)

This study was an attempt to examine the relationship between readiness and creativity. The sample was economically deprived kindergarten children in a city school system in the Southeastern United States. The children's overall performance on the readiness tests was low compared with published norms. The profile of group averages, however, indicated the presence of some figural creativity skills that were not adversely affected by poverty conditions. Data suggest strongly the need to strengthen the training of this type of child in the general areas of artwork, perceptual motor skills and elaborative responses if creativity development is to be enhanced.

Chambers, J. A. Beginning a multidimensional theory of creativity. *Psychological Reports*, 1969, *25*, 779-799.

In this paper, creativity is defined as a multi-dimensional process of interaction between the organism and its environment. This interaction results in new and unique products. The 3 main dimensions of creativity are defined as level, field, and type. Different hypotheses are given to account for the what, why, and how of creativity. Contributions by several theorists are considered and relevant research findings examined.

Dacey, J., & Ripple, R. *Relationships of some student characteristics and verbal creativity*. Paper presented at the Annual Meeting of the American Educational Research Association, New York, February 1967.

The purpose of this study was to investigate the relationship between student characteristics and measures of verbal creativity in 8th-grade youngsters. The students' characteristics studied were mental ability, sex, dogmatism, sex-role identification, independence, convergent thinking, organizational climate of the school, school anxiety, and constructive and unconstructive compulsivity. The measures of verbal creativity included imaginative story writing, flexibility, originality, fluency, and standardized total score on these 4. Results showed low multiple correlations between the student characteristics and the verbal creativity measures.

Datta, L. E., & Parloff, M. B. On the relevance of autonomy: Parent-child relationships and early scientific creativity. *Proceedings of the 75th Annual Convention of the American Psychological Association*, 1967, 149-150.

In an effort to determine whether creative adolescents, like creative adults, feel and describe their home environments as free and non-constraining, 1039 male high school seniors competing in the 1963 and 1965 Westinghouse Science Talent Searches were studied. Of these, 295 were described as more creative students and 744 were described as less creative students. Subjects completed a Parental Behavior Survey for 3 age periods (8-11, 12-14, and 15-17). Both groups described their parents as encouraging independence, moderately affectionate, and low in negative involvement and intrusive control. The more creative students reported lower levels of involvement and higher levels of autonomy than the less creative students. Relationships with the father were more relevant to creativity than relationships with the mother. There was less negative involvement by the mother, but not more positive involvement, reported by the more creative students when compared to the less creative students.

Friedman, M. I. (ED.) *The development of problem-solving skills in early childhood*. Columbia, S.C.: South Carolina University, 1971. (ERIC Document Reproduction Service No. ED 057 073)

This investigation was designed to identify scales indicative of the development of problem-solving behavior in young children and to discover whether children of different backgrounds exhibit similarities in the order of development and levels of achievement of problem-solving behaviors. Items from 22 tests were selected for use. Conclusions were: 1) there are problem-solving skills that develop in the same order among children of extremely different backgrounds; 2) there are particular problem-solving skills that develop in a different order for disadvantaged and advantaged children; 3) many item sets did not scale reliably for the disadvantaged children.

Hitt, W. D. Toward a two-factor theory of creativity. The Psychological Record, 1965, 15, 127-132.

This paper is based on the viewpoint that original thinking and logical reasoning are complementary components of creative thinking. When they act together, original thinking and logical reasoning allow the thinker to produce original and valuable creative ideas. After producing the ideas, the creative thinker evaluates them and hypothesizes from them. Then he must test his hypotheses using rigorous logic. The creative thinker must freely and spontaneously communicate his beginning ideas. Later he must systematically communicate the results of his hypothesis testing and his evaluation.

Houtz, J. C., Speedie, S. M., Ringenbach, S., Lash, A., and Feldhusen, J. F. A comparison of problem-solving abilities of disadvantaged and advantaged white, black, and Spanish-American elementary-school children. Unpublished manuscript, Purdue University.

In order to compare task-related behaviors of problem-solving abilities of elementary children, the Purdue Elementary Problem-Solving Inventory was administered. Second, 4th and 6th grade children, 1073 in all, representing different socioeconomic levels and ethnic origins, made up the sample. Results showed that differences in problem-solving abilities between socioeconomic and ethnic groups of children are not large. Developmental differences in problem-solving ability were found.

Krop, H. Effects of extrinsic motivation, intrinsic motivation, and intelligence on creativity: A factorial approach. Journal of General Psychology, 1969, 80 (2), 259-266. (Psychological Abstracts, 1969, 43, No. 11332.)

In order to study the effects of motivation and intelligence on creativity, the EPPS, the California Mental Maturity Scale, and the "Consequences" test were given to 216 students. The students were then divided into groups of high, low, and medium intelligence and high, low, and medium motivation. Half the subjects were in a high extrinsic motivation condition, while the other half was in a low extrinsic motivation condition. Results showed that high intelligence, high intrinsic motivation, and high extrinsic motivation all yielded higher creative responses. Significant interactions were found between intrisic motivation and intelligence and between intrinsic and extrinsic motivations.

Roweton, W. E., & Spencer, H. L., Jr. _Facilitative effects of practice upon nonverbal creativity_. Terre Haute, Ind.: Indiana State University, 1972. (ERIC Document Reproduction Service No. ED 059 563)

Numerous studies of verbal creativity indicate that idea originality increases progressively as more ideas are produced. The present study tested the effects of practice upon nonverbal creativity. Fifth-grade children were administered Form A and/or Form B of Torrance's picture completion task for 5 consecutive days. Figural originality increased with practice only on certain task items and, overall, only on Form A. Results were traceable to differences inherent in all alternate forms of the test, peculiarities of task items, amount of practice, and so on. Apparently, extended effort did not indiscriminately enhance figural originality in nonverbal creative problem solving.

Solomon, A. O. _A comparative analysis of creative and intelligent behavior of elementary school children with different socioeconomic backgrounds_. Washington, D. C.: American University, 1967. (ERIC Document Reproduction Service No. ED 017 022)

To test hypotheses related to the creative thinking of children from different socio-economic backgrounds, tests of creativity and of intelligence were administered to 1st, 3rd, and 5th-grade children from different socio-economic backgrounds. Children of each sex in each grade were tested for verbal intelligence and creativity. Significant relationships were found between socio-economic status and creativity when other variables were held constant; however, these relationships did not follow a consistent pattern. The incidence of these significant relationships tended to decrease with increasing age and grade level. Scores were completely uncorrelated with intelligence tests, confirming the importance of emphasizing creativity as a separate dimension of thinking.

Thomas, S. B. Creativity: A positive of young children. Urbana, Ill.: ERIC Clearinghouse on Early Childhood Education, 1973. (ERIC Document Reproduction Service No. ED 076 264)

A review of research on creative thinking indicates that disadvantaged children have creative strengths on which to build a program of education. Studies have shown that, in general, children from relatively disadvantaged backgrounds perform better on tasks of figural creativity than their advantaged peers. Studies also show that disadvantaged children perform better on figural creativity than they do on verbal creativity measures. Results of creativity research comparing black and white children are conflicting. Developmental racial comparisons show that black children catch up with, and in many cases surpass, their white peers in figural creativity.

Torrance, E. P. Can we teach children to think creatively?
Athens, Ga.: Georgia University, 1972. (ERIC Document
Reproduction Service No. ED 061 544)

The author summarizes the results of 133 studies designed to test approaches to teaching children to think creatively. While acknowledging criticisms that most of the studies use performances on tests of creative thinking and other creative school performances as criteria, he contends that the evidence which they provide can be extremely useful to educators. The most frequently reported types of experiments emphasize: 1) teacher-classroom variables, 2) compiled programs involving packages of materials, and 3) modifications of the Osborne-Parnes training program in creative problem solving. The most successful approaches, based on the author's review, are: 1) those that emphasize the Osborne-Parnes program, 2) other disciplined approaches, 3) the creative arts, and 4) media-oriented programs. The author concludes that, indeed, successful approaches do exist which make it possible to teach children to think creatively. An extensive bibliography is included.

Torrance, E. P. Dyadic interaction in creative thinking and
problem solving. Paper presented at the Annual Meeting of
the American Educational Research Association, New Orleans,
1973. (ERIC Document Reproduction Service No. ED 076 408)

The author reviews the research conducted on dyadic interaction and its role in the development of creative thinking and problem solving. Earlier research has shown that children at a certain stage prefer to work alone rather than with other children. However empirical data have shown on the whole that dyadic interactions result in better performance on creativity tests and other similar measures. There seems to be an egocentricism present in a child which gradually disappears, partially or fully, as the child grows older. Age studies have shown this transition period to be around 6 years old. Creative abilities and problem-solving abilities are shown to increase when mild degrees of stresses are introduced in a situation. The author points out that dyadic interaction does not always function. In one study, dyads showed considerably less group cohesiveness on ego-involving problems.

Appendix

Reviews of Instructional Material and Books For Teaching Creativity and Problem Solving

This Appendix presents the reviews of instructional materials and books on teaching creative thinking. The reviews of instructional material contain much specific information. Look at a sample review in that section. Then look at the headings described in Figure I. To the right of the headings are explanations of what each word or words mean.

The reviews will give you all the information you need to make a tentative decision as to the suitability of a kit or set of materials for your needs and interests. All of the reviews describe good, useful, productive instructional materials. Materials were included only after a careful inspection and review of a set indicated that it would be useful in teaching creative thinking or problem solving. When you settle on some materials which look interesting, you should read the entire review carefully.

The reviews of books on teaching creative thinking and problem solving are grouped together at the end of the Appendix. These reviews attempt to show how each book would be useful to the classroom teacher. They begin on page 147.

Figure I

The Format of a Review of Instructional Material

What:	This gives the title of the material and the author.
Published By:	This is the name of the company publishing the material and their mailing address.
How To Order:	This part give three pieces of information. The first bit will tell you where to send your orders. Usually this will be the publisher unless otherwise indicated. If it is the publisher it will say "Order from publisher." Use the address given above in the "Published By" section. The second bit of information is the price of the material at the time it was reviewed. The final bit of information tells what items or parts of the material will be expanded or lost as the kit is used in the classroom. These items can usually be replaced by the teacher or the publisher.
Description:	This section gives a brief description of the material, how it is used, and its most salient characteristics.
Target Audience:	This section describes the grade level for which the material is intended.

Materials Provided:

This section tells the quantity of the materials provided and names each piece that will come with the kit. The teacher should look at the "How to order" section to see what materials will have to be replaced.

Teacher's Guide:

If the kit contains a teacher's guide, this section will describe the guide and tell what you can expect from it. It will also tell about follow up activities that are suggested by the guide.

Subject Matter and Teaching Strategy:

This section describes how the material can be used in a variety of subject areas. You can use this information to plan how you will integrate a kit into your daily schedule, or use it to plan for creativity sessions in your classroom. The teaching strategy describes the suggested sequence of events that the teacher could use to teach a class. The use of the material with small groups, large groups and individuals is also discussed.

Rationale:

Here the fundamental nature of the material is discussed. Its theoretical bases are described.

Research or Evaluative Evidence:

This section describes the research or evaluation of the material and its results.

Reference:

These are references to the research, further readings, relevant theory, etc.

What: *American Language Today*

Cornelia M. Nachbar

Published By:

McGraw-Hill Book Company
Webster Division
30th Floor
1221 Avenue of the Americas
New York, New York 10020

How To Order:

Order from publisher.
More information on this program will be made available by contacting ALT product manager.
List price: Refer to "Materials Provided."
Consumable items: Workbooks.

Description:

American Language Today is a comprehensive and creative program fostering the development of skills using language in real life situations. This language arts program attempts to increase a student's pleasure in the creative use, control, and production of language. Seven main skills are developed:

Listening
Oral Language
Understanding Literature
Creative Dramatics
Visual Literacy
Written Composition
Creative and Critical Thinking

Target Audience: Grades 1-6.

Materials Provided:

American Language Today books are divided in eight chapters, each of which focuses on a single, major linguistic concept. Within each chapter, numerous and varied activities provide a range of language exercises meant to stimulate active student interest and involvement. *Workbooks* and *Webstermasters* used in conjunction with the *Teacher's Manual* provide many opportunities for individualization. *Cassette Tapes* provide even further listening and usage games, storystarters, and other activities to help individualize instruction. There are 5 levels to this series. The price range for each level is generally as follows:

One Pupil Edition @ $1.56 to $3.99.

One Teacher Edition @ $2.25 to $4.83.

One Evaluation Checklist (set of 30) @ $6.75.
Webstermasters @ $13.50.

One Workbook @ $1.11 to $1.17.
Cassette Tapes @ $39.00.

Supplementary bilingual materials for the first three levels of *American Language Today* are also available.

Teacher's Guide:

The teacher's manual helps the teacher individualize instruction, provides information to aid in the clarification of learning objectives, and recommends more effective approaches as needed.

Subject Matter and Teaching Strategy:

American Language Today is a complete sequential language arts program for grades one through six. It features inductive techniques, an inquiry approach, and involves activities which ensure active student involvement in the total learning process.

Many opportunities are provided for individualization within each grade level through choice of extension exercises and enrichment activities.

Grade-level designations do not appear on the pupilsbooks.

Rationale:

American Language Today reflects the conviction that a contemporary basal language art series must be as imaginative as the language and literature it purports to teach. It also reflects an awareness that the total communication process depends, not only on written and spoken language, but also on the non-verbal aanguages of movement and pictorial communication.

The American Language Today program is also based upon the belief that skills must be understood within the broad context of the physical, emotional and intellectual processes which require, but do not depend exclusively upon, knowledge for proficiency. Skills and subskills such as punctuation and grammar, for example, are regarded as tools which contribute to language ability but which do not restrict it to the confines of a set of arbitrarily determined rules.

For Further Reading:

General discussion

Logan, V., Logan, I., and Paterson, I. Creativity communication: Teaching the language arts. New York: Webster McGraw-Hill, 1973.

What: *Art Concepts and the Curriculum*

Carvel Lee Hammond and Lorita Lee Nelson

Published By:
Paul S. Amidon and Associates, Inc.
4329 Nicollet Avenue South
Minneapolis, Minnesota 55409

How To Order:
Order from publisher.
List price: Complete five Units $63.50.
Consumable items: Art sheets.

Description:

The *Art Concepts* series encourages creativity and self-expression in elementary school children. The purposes, according to the authors' introduction, are to

1) develop self-confidence through discussion, exploration, selection, and creativity; 2) provide visual and verbal outlets for personal experiences and happenings; 3) develop independent thinking and doing with an open and flexible mind; 4) discover new media and materials; and 5) help strengthen progressive muscular coordination and dexterity.

Target Audience: Pre-school - 6.

Materials Provided:
One vinyl report folio.
Eleven transparencies used as stimulants for artwork.
Twenty-nine art sheets.
One book of suggestions and questions for the teacher.

Teacher's Guide:

The teacher's guide gives a page of "Hints and Tips" to prepare the teacher. It also illustrates each transparency and art sheet as it might be completed by a student. Questions are also suggested which can be used to stimulate discussion.

Subject Matter and Teaching Strategy:

The teacher's guide suggests that each transparency first be shown to the whole class. The transparencies are used to introduce various concepts and stimulate pupils' imagination concerning various art techniques. After the transparencies are viewed, questions are asked which are generally based on the content of the transparencies. These questions are supplied by the kit and are intended to create enthusiasm and offer opportunity for verbal expression in preparation for use of individual pupil art sheets. Art sheets are then distributed to each student which provide a common starting point for the class. This allows every child to express his own ideas. Following this work the class discusses and explores the art concept involved. The students are then supplied with large sheets of paper and allowed to create whatever they wish.

The kit should be used with the whole class. However, the teacher could adapt the kit for small groups or individual work.

Rationale:

This kit uses a variety of activities to provide exercise in imagining, in solving problems, and in translating ideas to an art form. Independent thinking, feeling and interpreting is encouraged. The kit also is concerned with developing in students a positive view of art. This is accomplished by eliminating evaluation of students' work, displaying pupils' art and encouraging respect for individuality in interpretation.

What: Audiovisual Involvement Series: Concepts and Values for Early Education

Published By:
BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

How To Order:
Order from publisher.
List price: Set divided into four series of filmstrips ranging from $32.00-$40.00 each.
Consumable items: None

Description:

The Audiovisual Involvement Series is a collection of silent filmstrips with teacher manuals designed to elicit the active involvement of children in the development of primary learning skills, concepts, and values through role-playing activities. The children interact with the scenes or with the objects projected onto the screen in experiences directed toward building and refining observation skills, thinking skills, self-expression/creative expression, problem-solving, reasoning, and vocabulary development.

The series consists of thirty-one silent filmstrips. Seven major themes are represented (reasoning, using my imagination, let's pretend, taking care of myself, taking care of things around me, how I live in my world, and the problems of my world) and each theme unit has a teacher's guide which provides appropriate directions and questions for each filmstrip presentation.

The first three units are appropriate to developing problem solving skills and creative expression in children. The remaining four units deal with instruction in personal hygiene and safety, attitudes toward the care and preservation of personal and public property, scientific concepts, and social awareness.

Unit One, entitled "Reasoning," consists of four filmstrips which involve the children in acquiring important observation skills for both reading and for problem-solving. Visual discrimination and visual memory are strengthened through exercises showing a grouping of objects, then showing the same grouping with one or more of the objects missing or added. Students are asked to identify the missing items. Skills in classification, in knowing what evidence to look for in solving a problem, and how to interpret evidence are developed by the presentation of different settings from which children are asked to interpret the evidence and determine such things as "What is it like?", "What things do you need here?", "Where is this place?" This unit also presents the pupil with open-ended types of situations in which the student is asked to evaluate, to think of possible courses of action, and to state which action he or she would choose.

Unit Two, entitled "Using my Imagination," contains five silent filmstrips which present fantastic situations as aids in the development of basic conceptual skills (e.g. likenesses and differences, relative location and size, and geometric shapes). Creative expression is encouraged by asking each child to imagine how different projected objects might sound, feel, and taste. Children are encouraged to make comparisons of different objects and to suggest how things are similar and how they are different. Another filmstrip asks the children to use their imagination as they place toys or themselves in various positions on the screen. Here the emphasis is on skills relating to relative location discrimination.

Unit Three, entitled "Let's pretend," consists of four filmstrips which present imaginative situations designed to promote and sharpen students' ability to describe their reactions to a variety of situations, actions, shapes, and objects.

Because these filmstrips use images rather than words to stimulate creative functioning, they should be particularly effective for use with disadvantaged children.

Target Audience: Primary and elementary grades.

Materials Provided: The series contains thirty-one silent filmstrips on seven major themes. Each theme unit is accompanied by a guide which offers directions and questions for each filmstrip presentation.

Teacher's Guide: Each guide which accompanies the specific theme unit provides information on how to use the *Audiovisual Involvement Series* effectively to ensure the active participation of the children in each activity. Each frame of the filmstrips is described and sample questions are suggested for the teacher. Follow-up activities are suggested for each individual unit. The filmstrip itself contains a synopsis of the suggestions offered in the teacher's guide and it is suggested that the teacher review the filmstrip one day before it is presented to the children.

Subject Matter and Teaching Strategy: The *Audiovisual Involvement Series* is designed to develop language skills and concepts by using filmstrip pictures as the basis for instruction. Children stand in front of the screen and role-play in scenes or with objects projected on them. The picture may be projected directly onto a child or children (who are clothed with a white covering) who then "become" the picture. On-screen participants interact with off-screen participants. Presentation is controlled by the teacher who asks questions which are provided in each teaching guide of the unit.

Rationale: The Audiovisual Involvement Series is based on the rationale that children learn easier and better when they're actively involved in the presentation of materials. This immediate participation in the learning experience is uniquely realized by having children interact in a role-playing manner with a picture screen, with classmates, and with the teacher in directed experiences intended to build and refine various language, reading, and creative abilities.

What:	Creating Learning Centers Set 1: Intermediate Level by Margaret Hughes and Peggy Dakan Set 2: Primary Level by Sue Parker and Dorothy Thompson
Published By:	Creative Teaching Press, Inc. 514 Hermosa Vista Avenue Monterey Park, California 91754
How To Order:	Order from publisher. List price: $5.95 Consumable items: None
Description:	Creating Learning Centers presents materials and ideas for teachers and students on how to set up and use learning centers to facilitate discovery learning. Ideas are grouped into four categories: Science and math, language arts, social studies, and miscellaneous subjects. The activities involve learning and discovering facts about nature, numbers, literature, history, and language.
Target Audience:	Set 1, Intermediate elementary Set 2, Primary (grades 1-3)
Materials Provided:	56 Idea Cards, outlining objectives, materials, and activities. Notes to the teacher.
Teacher's Guide:	An introduction addressed to the teacher is included that describes learning centers and what they should include. Suggestions are offered, but teachers are encouraged to fashion the center

to suit their individual class needs.

Subject Matter and Teaching Strategy:

The learning center is, by its very nature, a free-form activity that can be molded to fit the individual teacher and the class. The general teacher suggestions presented in Creating Learning Centers show how to develop a center that reflects the needs and abilities of one particular class. The activity cards enable the teacher to set up a learning center and select appropriate materials. Learning centers may involve an entire class at once, small groups, or individuals on their own time. They may take the form of extra credit activities, or be used as a regular part of the weekly or daily curriculum. The teacher can explore the ideas and establish the best way to use them in the classroom.

Rationale:

The kits are a product of the belief that student involvement and teacher-student interaction are vital conditions for effective learning. When students work on their own, and are interested and enjoy their studies, their performance and growth are especially rewarding.

What: Creative Activities for Language Arts
For the development of Individual Creative Abilities

Genevieve Bylinowski

Published By: Hayes School Publishing Company, Inc.
Wilkinsburg, Pennsylvania 15221

How To Order: Order from publisher.
List price: $3.00.
Consumable items: 30 spirit or liquid duplicating masters.

Description: Creative Activities for Language Arts is a collection of creativity-oriented ideas that involve children in writing, drawing, and reading. Each activity is designed to be interesting and stimulating to students and involves ideas and objects that they are familiar with. Some activities require adding parts to stories, drawing expressive pictures, asking questions, and inventing things. All of them allow the young reader and writer to express himself, and they encourage the growth of each child's creative and expressive capabilities.

Target Audience: Children 7-12 years old.

Materials Provided: A booklet of 30 8" x 11" duplicating masters of ideas. Each sheet contains enough space for each child's responses. Introduction and notes to the teacher.

Teacher's Guide: The introduction presents the purpose of the booklet, and a short comment is given for each of the 30 activities. The comments explain the rationale for the particular activities, and sometimes suggest how an exercise can best be used in the classroom.

Subject Matter and Teaching Strategy:

The activities are all directed towards the development of the individual student's language-related creative abilities. The collection does not form a self-contained program, but instead is intended to be a supplement to normal instruction that can be used whenever the teacher desires. Each exercise could be presented to one student, or to an entire class.

Rationale:

Creative Activities for Language Arts is based on the concept that in order to develop children's creative thinking, they must have varied practice in producing ideas. By challenging children, the activities encourage individual expression and depth of thinking that is essential to creative development.

What:	Creative Art Series
Published By:	RMI Film Productions, Inc. 701 Westport Road Kansas City, Missouri 64111
How To Order:	Order from publisher. List price: $15.00 for Filmstrip plus Record or Cassettes Consumable items: None.
Description:	The Creative Art Series contains five filmstrips which present instructions for using five major art media: clay, tempera paint, mobiles, puppetry, and chalk. Each filmstrip shows a teacher and students using an art media and gives ideas for adapting art projects in the classroom.
Target Audience:	All elementary grades.
Materials Provided:	Five filmstrips. Each filmstrip consists of 43-70 frames, lasting for 8-11 minutes. Each filmstrip develops one of the art media. It presents a brief orientation to the media (history, where the material comes from, different uses of the material), and explains "how-to-create" with the material. Each filmstrip is accompanied by a long playing record or cassette. It provides narration for the instructional activity presented in the filmstrip. Additional equipment needed: Filmstrip projector and screen; record player or cassette player.
Teacher's Guide:	None provided.
Subject Matter and Teaching Strategy:	The filmstrips can be used to introduce students to the different media or they can be presented in conjunction with the use of such material. The total class can be shown the filmstrip

and then individual or group projects, using the materials, can be conducted.

Rationale:

The Creative Art Series is designed to develop creativity through visual and sound stimulation and specific guidance. It offers an interesting approach to art media, which captures and holds the student's attention. Students use new information presented in the series by participating in the creative activities portrayed in the filmstrips.

What:

Creative Expression: Lower Primary

Billy Leon Shumate

Creative Writing: Primary

Billy Leon Shumate

Creative Writing: Intermediate

Alice and Lawrence L. Tomas

Creative Writing: Upper Intermediate

Lawrence L. Tomas

Published By:

Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

How To Order:

Order from publisher.
List price: $7.95 for each level.
Consumable items: Duplicating masters.

Description:

Creative Expression and the three *Creative Writing* books constitute a series designed to stimulate children to think, to detect and express their feelings and attitudes, and to creatively extend what they learn. *Creative Expression* is designed for those without writing skills, and accordingly requires oral responding. The other books of the series concentrate on creative expression through writing. Colorful transparencies that entertain and hold the attention of children are central to the kits.

Duplicating masters of activity pages ask opinions and invite creative answers about the situations depicted. Creative writing suggestions are included in the upper levels, with thematic pictures provided in the lower primary booklet.

Target Audience: Lower Primary to Upper Intermediate.

Materials Provided: 8½" x 11" color transparencies of discussion themes and situations for use in overhead projectors. (Booklets are available without transparencies.)

Duplicating masters provide individual facsimiles of transparencies for each student's personal use.

Teacher's Guide: Also included for the teacher are objectives for each unit, suggested questions, and additional activities.

Subject Matter and Teaching Strategy: Themes for each unit are of everyday activities, special events, fantasy, animals, and other subjects that are interesting to the child and can stimulate his or her thinking. The series may be useful as an occasional addition to normal classroom work or as a regular part of the class activities. Students could use the activities individually and progress as they desire.

Rationale: Emphasis is placed on encouraging the child to express himself and his ideas, while grading and criticism are de-emphasized. Individual differences are recognized and accounted for, and the importance of the recognition of and the expression of each child's individuality is stressed.

What: Creative Expression Books

Scholastic Book Services

Published By:

Scholastic Book Services
901 Sylvan Avenue
Englewood Cliffs, New Jersey 07632

How To Order:

Order from publisher.
List price: $.60 per book. A free Teaching Guide is included with orders of 10 or more of any title.
Consumable items: Individual workbooks.

Description:

Each creative expression book, written to build spelling, vocabulary, grammar, and thinking skills at a particular grade level, consists of fourteen creative writing lessons bound in a colorful, imaginatively designed paperback cover which is not marked for grade level. Each lesson is created to stimulate written expression using a specific technique. Topics covered include parody, detective writing, free verse, cinquains, haiku, descriptive writing, rhymed poetry, and many other types of creative writing. Two basic kinds of lessons are presented. In one kind an explanation of a technique, such as haiku, is followed by examples and pictures for the student to write about. In another type, lesson pictures are presented and the student is asked to write about them in a particular way--for instance, as if he were experiencing the scene pictured. Many of the pictures accompanying the lessons show black and white children in inner-city or urban settings. Topics of current interest such as conservation, over population, and the world food supply are included.

Target Audience: Grades 2-6.

Materials Provided:

Each of the five workbooks provides space for individual writing in response to each lesson and a page for an individual wordlist. Book titles and grades are the following: "Dinosaur Bones," grade 2; "Jungle Sounds," grade 3; "Ghost Ships," grade 4; "Cook Up Tales," grade 5; "Adventures with a Three-Spined Stickleback," grade 6.

Teacher's Guide:

The teacher's manual to accompany each book provides the rationale for using the workbook and suggests optimum conditions for using the lessons. Discussion ideas are given for each lesson so that the teacher can encourage oral expression. Ideas for follow-up activities are also listed.

Subject Matter and Teaching Strategy:

The content of these lessons is particularly applicable to language arts since lessons involve creative expression, both oral and written, and emphasize creative use of words. The workbooks could be used by a whole class during a writing period or they could be used by small groups or students individually. They would also work well as available material in a learning center.

Rationale: These workbooks are designed to stimulate exploration and articulation of thoughts and feelings and to encourage creative written and oral expression.

What: *Creative Language Projects: Independent Activities In Language Arts* (Books A-E)

Mary Pat Mullaney

Published By:
Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

How To Order:
Order from publisher.
List price: $3.75 per booklet
Consumable items: Each booklet contains 28 duplicating masters.

Description: *Creative Language Projects* requires students to think creatively, use their imagination, think of unusual ideas, and solve unusual problems. The individual problems are meant to be fun and give children practice in expressing themselves in a creative manner through original writing, evaluation, and problem-solving.

Target Audience:
Book A, Grades 1-2
Book B, Grades 2-3
Book C, Grades 3-4
Book D, Grades 4-5
Book E, Grades 5-6

Materials Provided: Includes 8½" x 11" duplicating masters (28 per book) of illustrations and related questions that require opinion, problem solving, and creative expression of the child's own thoughts about the problems and situations presented.

Teacher's Guide: Booklets are prefaced by an explanation of the exercises and how the teacher may best use them.

Subject Matter and Teaching Strategy:

The exercises that comprise each booklet concern everyday objects, animals, and people that the child should be familiar with. The materials may be used as supplements to regular reading or English programs, for extra credit, or for whatever specialized pupose the teacher desires. The projects may be most useful when a more informal fun atmosphere is desired in the classroom.

Rationale:

Emphasis is placed on the individual nature of each child's creative processes and abilities. Through individual use of the activity sheet replications, the child can find his own answers and express himself in relation to ideas, objects, and events common to his or her world.

What: *Creative Moments Kits*

Published By:
Creative Teaching Press
514 Hermosa Vista Avenue
Monterey Park, California 91754

How To Order:
Order from publisher.
List price: $4.95.
Consumable items: None.

Description: *Creative Moments Kits* is a collection of exciting creative activities which are organized in convenient folders. Each folder presents a complete activity. The folders are stored in a file box for easy access by individual pupils.

Target Audience: Elementary grade levels.

Materials Provided:

Kit 1 - Creative Moments for Children. For ages 4-9. Contains fifty activity folders, which use readily available materials. Easy-to-follow directions and illustrations are found in each folder. Five different areas are presented: story projects, creative games, design ideas, discovery experiments, and challenge folders. Activities vary from growing a garden in a glass to creating designs with straws.

Kit 2 - Creative Moments for Children. For ages 8-12. Fifty activity folders are found in this kit. Directions and illustrations are given on each folder. Five different areas are presented: imaginations, creative games, design ideas, discovery experiments, and challenge folders. Activities include writing secret codes to organic gardening.

Kit 3 - Creative Moments Investigations. For ages 10-14. Contains fifty scientific activities. Directions and illustrations are provided on each folder. Covers five areas of study: ecology, chemistry, physics, people, and investigation techniques. Activities range from organizing a laboratory to examining crystals.

Teacher's Guide: None provided. Directions and illustrations are given on the individual folder.

diate grades, literature, and poetry are covered in this book.

Creative Teaching of the Creative Arts in the Elementary School is the third book of the series. Methods for supporting creativity through art, music, dance and rhythm, and dramatization are presented.

Creative Teaching of the Social Studies in the Elementary School offers techniques for nurturing creativity in the social studies. The book discusses the use of textbooks, audio-visual methods, individualization, buzz groups, brainstorming, and various other methods.

Creative Teaching of Mathematics in the Elementary School presents ways of teaching mathematics creatively. Addition, subtraction, multiplication, and fractions are some of the areas covered in the book.

Creative Teaching of Science in the Elementary School is the final book of the series. It deals with methods which foster creativity in science.

Teacher's Guide:

Each book is designed as instructional material for teachers.

Subject Matter and Teaching Strategy:

Each of the seven books covers a different subject area. Teachers can easily take the principles of creative teaching which are presented and adapt them to their own classrooms.

Rationale:

The ideas and principles presented in the books are designed as guidelines for creative teaching in the elementary school. Each book proposes to build favorable attitudes towards creative teaching rather than to develop a "cook-book" of teaching methodology.

Subject Matter and Teaching Strategy:

The activities can be used to supplement classroom exercises or to provide children with alternative activities after completing required class work. The can also be used effectively as homework. The activities are designed to be used individually or in small groups. Students are provided with directions on each folder, so further directions from the teacher are not required.

Rationale:

Creative Moments Kits provide children with inviting and challenging activities. Children are free to explore and develop their thinking abilities. The reusable folders allow each child to try all activities, and to return to favorite activities, reaching a new level of understanding each time.

What: Creative Patterns

Wilma Longstreet

Published By:
H. Wilson Corporation
555 West Taft Drive
South Holland, Illinois 60473

How To Order:
Order from publisher.
List price: Two Cassettes - $17.50
Two Records - $13.00
Four Tapes - $17.50
Consumable items: None.

Description: This kit is a series of stories that introduce a variety of people and places to young children. The ideas presented are basic to conceptions of friendship, visual perceptions, and other aspects of a child's growth. The ideas are treated by the use of games and stories that hold the interest of children and challenge their imaginations. A central theme of the series is cultural enrichment through broadening knowledge, experience, and creative expression in response to experience.

Target Audience: K-3.

Materials Provided: Two cassettes, two records, or four reel-to-reel tapes.

Teacher's Guide.

Teacher's Guide: The Teacher's Guide introduces the purposes of Creative Patterns and offers suggestions to teachers in the use of each segment of material. Sample discussion questions are also included.

Subject Matter and Teaching Strategy:

Children may listen to the tapes individually and respond as they choose, or larger groups could participate. Group discussion on the meanings of the material should serve to stimulate interest and thought about the ideas presented in the series.

Rationale:

The guiding rationale behind Creative Patterns is that children must become fully aware of all the aspects of their environment and that by developing expressive and creative faculties, the series allows children to receive the most from life and give the most to others.

What: Creative Teaching Series

Published By:
Allyn and Bacon, Inc.
150 Tremont Street
Boston, Massachusetts

How To Order:
Order from Publisher.
List price: Range from $4.95 - $8.95
Consumable items: None

Description:

The Creative Teaching Series is comprised of seven books concerned with creative teaching in the elementary schools. Each book contains methods and activities that promote creativity in the classroom. Seven different areas are covered: setting conditions for creative teaching, language arts, reading and literature, creative arts, social studies, mathematics, and science.

Target Audience: Grade levels 1-8

Materials Provided:

Setting Conditions for Creative Teaching in the Elementary School is the first book of the series. The first part of the book is concerned with the nature of creativity. It offers a definition of creativity and characteristics of creative individuals. Part two of the book presents ways in which to nurture creativity in the classroom.

Creative Teaching of the Language Arts in the Elementary School offers methods for supporting creativity in the language arts. Areas covered by the book include listening, oral expression, creative writing, handwriting, grammar, word usage, and spelling.

Creative Teaching of Reading and Literature in the Elementary School presents principles of creative development in reading and literature and ways teachers can use these principles in the classroom. Reading in the primary and intermediate grades, literature, and poetry are covered in this book.

Creative Teaching of the Creative Arts in the Elementary School is the third book of the series. Methods for supporting creativity through art, music, dance and rhythm, and dramatization are presented.

Creative Teaching of the Social Studies in the Elementary School offers techniques for nurturing creativity in the social studies. The book discusses the use of textbooks, audio-visual methods, individualization, buzz groups, brainstorming, and various other methods.

Creative Teaching of Mathematics in the Elementary School presents ways of teaching mathematics creatively. Addition, subtraction, multiplication, and fractions are some of the areas covered in the book.

Creative Teaching of Science in the Elementary School is the final book of the series. It deals with methods which foster creativity in science.

Teacher's Guide:

Each book is designed as instructional material for teachers.

Subject Matter and Teaching Strategy:

Each of the seven books covers a different subject area. Teachers can easily take the principles of creative teaching which are presented and adapt them to their own classrooms.

Rationale:

The ideas and principles presented in the books are designed as guidelines for creative teaching in the elementary school. Each book proposes to build favorable attitudes towards creative teaching rather than to develop a "cookbook" of teaching methodology.

What:	Creative Values Kits
Published By:	Schloat Productions 150 White Plains Road Tarrytown, New York 10591
How to Order:	Order from publisher. List price: Creative Values: Justice @ $63.00 Creative Values: Equality @ $63.00 Creative Values: Liberty @ $63.00. Consumable items: None.
Description:	The Creative Values Kits examine the dimensions of justice, equality, and liberty. Filmstrips in each kit present problem situations on these topics which allow students to question, discuss, and propose creative solutions to the problems.
Target Audience:	Upper elementary grade levels.
Materials Provided:	Creative Values: Justice contains four filmstrips and audio cassettes which examine different aspects of justice: individual motivation, individual compassion, individual integrity, and individual responsibility. Creative Values: Equality consists of four filmstrips and audio cassettes which present different views of equality: role equality, privacy, the common good, and excellence. Creative Values: Liberty contains four filmstrips and audio cassettes which deal with different ideas of liberty: rules, courage, individualism, and creativity. All the filmstrips are four to six minutes in length. Each kit in-

cludes a teacher's guide.

Additional equipment is necessary. A filmstrip projector and screen and a cassette recorder are necessary to use this kit.

Teacher's Guide:

A teacher's guide is included in each kit. It presents a general introduction, learning objectives, and suggested use of the program. A daily plan for each filmstrip is also provided. The daily plans include learning outcomes, learning activities, and primary and secondary questions corresponding to each filmstrip. An appendix gives the theory behind each of the creative values.

Subject Matter and Teaching Strategy:

The Creative Values Kits do not deal with a specific curricular area, but increase children's ability to solve problems involving moral decisions creatively. Each of the four filmstrips found in a kit is a one-week study unit. The filmstrips should be shown to the total class, and then implemented by discussion groups and individual and group projects. One complete kit takes four weeks to finish. Each lesson is flexible enough to allow the teacher to use the materials as they are best suited for particular situations.

Rationale:

The Creative Values Kits stimulate creative self-questioning and problem solving by presenting conflicts which students must solve. Each particular value is represented in futuristic settings which parallel daily value choices encountered in reality. The futuristic settings eliminate personal threats and allow children to freely explore their values.

What: Creative Writing

Ronald J. Baio

Published By:

Hayes School Publishing Company
321 Pennwood Avenue
Wilkinsburg, Pennsylvania 15221

How To Order:

Order from publisher.
List price: $3.50.
Consumable items: 28 spirit or liquid duplicating masters

Description:

Creative Writing is a workbook of writing activities that challenge students to manipulate letters and words to form meanings and to write their own material. The material that is supplied in each activity is intended to stimulate children's thinking, and to encourage and sharpen those skills necessary for good writing. Visual perceptions, reasoning and other skills are treated and enhanced by the various exercises.

Five types of activities are included: unscrambling words, unscrambling sentences, completing sentences, completing paragraphs, and completing short stories. The first four types of activities prepare students for the fifth and highest type of activity, completing short stories.

Target Audience: Middle and Upper grades.

Materials Provided:

A booklet of 28 8" x 11" duplicating masters of activities and starters. Introduction with notes to the teacher.

Teacher's Guide:

An introduction explains the goals of and the reasoning behind the workbook. Suggestions for implementing and evaluating students' work are included, as are the unscrambled words and sentences from the exercises.

Subject Matter and Teaching Strategy:

Each writing activity is for an individual student and the goal of each is to encourage the writing skills of the individual. As such, the exercises may be assigned on an individual basis or to a group of students.

When assigning the more sophisticated paragraph and short story completions, the teacher may apply whatever degree of structure that he/she desires. It may be desirable to explain rules of structure and composition, or adopt a completely open format. The booklet is meant to be flexible, in that it can serve the individual needs of teachers and students.

Rationale:

The rationale behind Creative Writing is that literary creation requires certain skills of perception, reasoning, and thinking. By stimulating and challenging students, the units can encourage the practice of those necessary skills and make creative writing an enjoyable experience.

What: *Creative Writing Skills* (Book I and Book II)

C. M. Charles and M. Church

Published By:
T. S. Denison and Company, Inc.
5100 West 82nd Street
Minneapolis, Minnesota 55431

How To Order:
Order from publisher.
List price: Book I (No. 513-0077-8) @ $3.95 each
Student Workbook (No. 513-00180-8) @ $.60 each
Book II (No. 513-00179-4) @ $3.95 each
Student Workbook (No. 513-00178-6) @ $.60 each
Consumable items: None.

Description:

Creative Writing Skills (I and II) offers the elementary school teacher a series of easy to teach writing exercises which develop creative writing skills. Each series of exercises was designed to increase the generation and flow of ideas from children and to develop skills of putting these new ideas into language. Each series of lessons emphasizes *thought*, rather than handwriting, punctuation, grammar, or capitalization. These latter skills should be developed in the language curriculum. This program offers writing activities which can augment and supplement the present language curriculum in important ways.

Creative Writing Skills (I and II) seeks to achieve these four specific goals: (1) to improve the child's ability to select words and phrases that are appropriate to a situation, (2) to develop organization skills incidentally through purposeful writing activities, (3) to teach children how to write reasonable, coherent, possible, and satisfying endings, and (4) to encourage unusual and exciting beginnings to their compositions. Each lesson concentrates on developing particular components of a composition (i.e. main ideas, supporting ideas, topic sentences, sequence, paragraphing) rather than entire compositions. The lessons were designed to be taught in their proposed sequence. However the lessons are internally flexible enough to be modified to suit the needs of the class.

Target Audience:

Creative Writing Skills (Book I) is designed for use in grades K-3. Creative Writing Skills (Book II) is designed for use in grades 4-6.

Materials Provided:

The Creative Writing Skills program consists of a teacher's manual and a student workbook. The student workbook contains pictures and writing space which corresponds to the various lessons described in the teacher's manual.

Teacher's Guide:

The guidebook for teaching creative writing skills describes and explains the Creative Writing Skills program. The time for each writing exercise is given. The purpose and goal of the lessons are described. Procedures for the activity are explained and suggestions on how to make "the most efficient use of the lessons" are also given.

A copy of the student workbook is attached to the teacher's guidebook.

Subject Matter and Teaching Strategy:

Creative Writing Skills (Books I and II) are designed for use as a supplement to the regular composition curriculum. Mechanics of writing is not stressed explicitly. The program emphasizes activities which increase the generation and flow of ideas and the development of writing skills for putting these new ideas on paper rather than skills of handwriting, punctuation, grammar, or capitalization.

Each writing activity can be effectively performed by the entire class for periods of 25-30 minutes. They will be most effective if separated by no more than two days between lessons. Although the program is designed to develop a particular skill in a systematic, sequential way, each lesson is internally flexible enough to be modified to meet the needs of the class.

Rationale:

Creative Writing Skills (Book I and II) is based upon the rationale that no matter what the backgrounds of children are, they can learn to think more creatively and write more effectively. The exercises in this program were designed to make each child a better communicator. Skills of communication are very important and generally can be developed only with practice. This writing program attempts to inspire children to create novel ideas and to provide guidance in ways to write more effectively.

For Further Reading:

General discussion:

Bais, R. J. *Creative writing*. Wilkinsburg, Pennsylvania: Hayes School Publishing Co., 1963.

What: Crossroads

Burton Goodman

Published By:

Noble and Noble Publishers, Inc.
One Dag Hammarskjold Plaza
245 East 47 Street
New York, New York 10017

How To Order:

Order from publisher.
List price: Prices vary. Individually listed under "Materials Provided.")
Consumable items: Workbooks.

Description:

Crossroads is a reading and language arts program designed to be highly interesting to junior high and high school students who are reading on fourth through ninth grade levels. It develops reading, composition, oral language, critical thinking and writing skills. High interest stories, selected to appeal to adolescents, particularly "reluctant readers," are offered and include many dealing with values, family conflict, boy-girl relationships, prejudice, and responsibility. They are arranged in groups in colorful paperbacks with interesting and well-designed covers. An excellent attempt has been made to choose stories and accompanying pictures which present positive and negative perspectives of life experiences and problems encountered by minority adolescents, particularly those in the inner-city.

Discussion activities suggested to accompany the stories emphasize relating stories to each other and considering stories as presenting alternative solutions to problems. Students are asked to think beyond the stories to arrive at original solutions. A student workbook contains activities to follow each story. Emphasis is placed on interpreting cartoons in relationship to the stories, arranging items in sequence, writing letters and news articles, finding supportive evidence in stories, and expressing opinions and emotions creatively. A classroom library of high interest books is available to accompany anthologies at each level. A long-playing record is available for use with each paperback.

Target Audience: Junior high and high school readers on fourth to ninth grade reading levels.

Materials Provided: Four paperbacks at each level ($1.48 each).

Level 1 - *With It*; *Solo*; *Against All Odds*; *Beyond Tomorrow*
Level 2 - *Love's Blues*; *Me, Myself, and I*; *Dreamers of Dreams*; *He Who Dare*
Level 3 - *Tomorrow Won't Wait*; *Breaking Loose*; *In Others' Eyes*; *Playing It Cool*

Each book contains short stories and poems arranged in groups according to a central theme.

A student workbook for each level ($1.16 each) containing activities which students can complete in the book.

A teacher's guide at each level ($2.96 each).

An LP record to accompany each paperback ($7.45 each).

A classroom library for each level ($29.95 each) containing 40 volumes of 12 titles.

Teacher's Guide:

An accompanying teacher's manual explains the rationale behind Crossroads, suggests the role of the teacher in using Crossroads materials, and establishes some guidelines for using role-playing and group work techniques. For each story it suggests a procedure for the teacher to follow, lists questions to be asked, and provides ideas for follow-up activities such as creative writing, role-playing and artwork.

Subject Matter and Teaching Strategy:

This program is designed to provide for reading and language arts instruction on junior high and high school levels. It seems particularly valuable as an alternative program for individuals or small groups who are not easily involved in the regular curriculum.

Rationale:

Crossroads captures the attention of adolescents by presenting stories of experiences and problems relevant to their world. Materials are designed to stimulate imagination and encourage creative self-expression. Emphasis is placed on finding likenesses between seemingly different situations, interpreting cartoons, pictures, and story action, and developing ideas beyond the stories' limits in order to nurture development of oral language, critical thinking and writing skills.

What: Developing Creative Ability

Dorothy J. Skeel, D.Ed.

Published By:
H. Wilson Corporation
555 West 166th Street
South Holland, Illinois 60473

How To Order:
Order from publisher.
List price: Cassettes - $17.50
Records - $13.00
Tapes - $17.50
(Reel-to-reel)
Consumable items: None.

Description: Developing Creative Ability is a series of learning activities that are based on children's listening, interpreting, and creative abilities. They develop creative ability by encouraging children to listen carefully, form mental images, and respond creatively to their experiences. Expression takes the form of writing, speaking, storytelling, dramatizing, and painting.

The series consists of four segments, each treating language-related expression and listening in a different way. The first section requires children to listen to various familiar sounds and identify them. Section two provides a series of sounds at the end of a story. Children are expected to write the ending action. The last two sections require children to add descriptive words and stories in response to sound stimuli. Each activity, whether a game or exercise, is designed to sharpen listening skills and encourage creative imagery and expression.

Target Audience: Lower elementary.

Materials Provided: Two cassettes, 2 records, or 4 reel-to-reel tapes. Teacher's guide.

Teacher's Guide: An introduction is provided that explains the rationale and objectives of the series and offers suggestions for the use of each segment in the classroom.

Subject Matter and Teaching Strategy: The activities in *Developing Creative Ability* usually must be handled by the teacher. They may be useful in small groups or larger classes, in which all listen and create their own responses. Dramatic expression is possible as small group activity, and discussions about possible interpretations may serve to increase interest and motivation.

Rationale: *Developing Creative Ability* is based on the rationale that every child has creative ability that must be encouraged. It is thought that this can be best done in a warm, relaxed atmosphere that values individual thought and expression. This individual expressive ability is an outgrowth of and important to a child's sensitive understanding of himself/herself and his/her world.

What: Discovering How to Learn

Herbert A. Sprigle, Ph. D.

Published By:

Science Research Associates, Inc.
259 East Erie Street
Chicago, Illinois 60611

How To Order:

Order from publisher.
List price: $176.00.
Consumable items: None.

Description:

Discovering How to Learn is the second early-childhood program of the Inquisitive Games sequence. The program uses a series of games and activities to help children learn. Discovering How to Learn allows children to discover strategies for gathering, organizing, and processing information, and helps them develop effective language skills for communicating their thoughts and decisions. Children use sight, touch, and learning to gather, organize, and process information.

Target Audience: Preschool and early elementary grade levels.

Materials Provided:

Discovering How to Learn Kit.

Games. The kit contains 16 games, with equipment for four children. The games are packaged in envelopes; two envelopes per game. Game pieces include: game boards, puzzles, playing cards, and spinner-pattern cards.

Spinner. A spinner is a 5" x 5" spinner-pattern card with a center hole on which a plastic spinner unit (a center post with a double-ended pointer) is placed. Six spinners are in the kit. Children take turns using the spinner.

Picture cards. The kit contains five different sets of large colored picture cards. One set of cards covers each of these areas: clothing, food, furniture, animals, and transportation.

Charts. Two charts are included in the kit. Directions for using the charts are found in the *Teacher's Handbook*.

Clue Game. The Clue Game is a teacher-directed activity. Equipment for this game is packaged in a separate envelope. Directions for this activity are found in the *Teacher's Handbook*.

Teacher's Handbook.

Teacher's Guide:

The *Teacher's Handbook* introduces the teacher to the program and presents a general overview of the program. It gives complete and detailed directions for using each game and activity.

Subject Matter and Teaching Strategy:

Discovering How to Learn is a series of exercises which are not tied to any particular subject area, but rather help the child to develop general learning strategies. The games and activities presented in this program are designed for use in small groups. The best results are achieved if children are divided by ability into groups of three or four. This permits the teacher to assess each child's progress.

Rationale:

The games and activities are appealing and help children reach the program's goals by arousing their curiosity. Clearly defined goals are provided in the games and activities. The structure of the games can be controlled so that the children must use past experiences, organize information, and communicate decisions to move towards a goal.

Research or Evaluative Evidence:

The author describes a study which used Discovering How to Learn successfully with two different groups of five-year-olds, one a group of disadvantaged children, the other a group of middle-class children. Testing showed significant gains in IQ scores, readiness skills, and language development after the completion of the program. The study was done at a school in Jacksonville, Florida.

What: Discovery Stories

Robert Sargent

Published By:
Urban Media Materials
212 Mineola Avenue
Roslyn Heights, New York 11577

How To Order:
Order from publisher.
List price: $60.00.
Consumable items: None.

Description: Discovery Stories confronts children with some common problems that most humans face in their daily lives. The central characters in the stories find ways to resolve the big problems or investigate lesser problems which will help solve the big problems. After the story, questions are posed and the important points reviewed. These questions help in starting class discussion that brings out the salient points.

Target Audience: Lower elementary grade level.

Materials Provided:
One "Suggestions for Use" book.

Four film strips for use with DUKANE projectors.

Two records (the average running time of each story is about 8 minutes 30 seconds).

One container lot for storage.

Teacher's Guide: A short teacher's guide (three pages) is included which discusses the purpose of the Discovery Stories, gives the running time for each story and the main theme, and poses the questions to be asked at the end of each story.

Subject Matter and Teaching Strategy:

These four stories can be used in a variety of subject areas. The theme of each story is versatile enough to allow for many uses. The first story is concerned with delinquency. The characters play hooky and disobey rules. The story deals with their responsibilities and the consequences of ignoring these responsibilities. It also argues for the value of school in helping people better themselves. (Running time 8 minutes, 50 seconds.)

The second story deals with interpersonal relationships, sharing, cooperation and helping one's neighbor. These themes are all dealt with through the dispute of a mouse and a worm over a hole in the ground.

The third story is concerned with the environment. Overcrowding and the improper use of resources cause serious problems in the community. The story tells how we must plan ahead so that we may have a healthy environment.

The fourth story describes how we should all help to stop pollution. In this story the animals in the zoo are led by two butterflies to clean the park. They show the people what can be accomplished if everyone cooperates. All the stories but the third involve animal characters.

The teacher could use the stories with the whole class or with small groups of even individuals. If record player and projector equipment are available, two groups could be working at once on the same material.

Rationale: The stories help teachers to introduce children to the world's problems and stimulate them to think creatively in searching for solutions. This is accomplished by presenting very complex problems in a very simple way. When the children begin to understand the problems they can begin to think and suggest solutions to these problems.

What: *Early Childhood Curriculum: A Piaget Program*

Celia Lavatelli

Published By:
American Science and Engineering, Inc.
20 Overland Street
Boston, Massachusetts 02215

How To Order:
Order from publisher.
List price: Refer to Materials Section.
Consumable items: None.

Description:

Early Childhood Curriculum: A Piaget Program is a problem-solving oriented program for the pre-school youngster which emphasizes learning by doing. The 22 materials sets provide over 100 activities in Classification, Number Measurement, and Seriation. The materials are attractively presented in various tasks in which the child solves a problem by *doing* something physically and mentally with the concrete materials.

Early Childhood Curriculum: A Piaget Program is designed to foster the development of intellectual skills and operations used in classification, number, space, measurement, and ordering tasks.

Target Audience: Pre-school.

Materials Provided:

One materials kit, including a teacher's guide, is provided for each theme. For each theme there are a number of sets of materials to allow different approaches:

Classification - $139.50
Number Measurement and Space (Conservation) - $96.00
Seriation - $53.00.

One reference book: *Piaget's Theory Applied to an Early Childhood Curriculum*. Celia Lavatelli. $6.95.

Total program cost: $295.45.

Kits may be purchased individually.

Extra Teacher's Guides are available at $3.00 each. (Specify English or Spanish.)

Teacher's Guide:

The teacher's manual is a how-to-do-it guide for the teacher, giving specific directions for translating Piaget's theory of intelligence into action in the classroom. It guides the teacher in implementing the aims of the program. *Early Childhood Curriculum: A Piaget Program* is designed to meet the intellectual needs of individual children. It aims to enhance awareness in both the teacher and child of various problem-solving strategies. Once comprehended, these strategies can be generalized to a wide variety of problem situations.

The reference book, written by the author of this curriculum program, provides the teacher with information on the rationale of the curriculum. For the teacher unfamiliar with Piaget's developmental theory of intelligence, this is a handy sourcebook.

Subject Matter and Teaching Strategy:

Early Childhood Curriculum: A Piaget Program is a structured program which progresses from very simple activities to more difficult ones. It could easily supplement any pre-school learning activity. The subject matter deals with classification, number, space, measurement, and seriation by means of the manipulation of concrete objects.

A problem-solving approach is used. With guidance from the teacher, and from his/her manipulations of the visual display of the problem, the child comes to learn relationships of size and distance, quantity and volume. Problem-solving strategies which had previously been unknown by the child are discovered and used in a variety of similar problem situations.

The short structured activities provided by this curriculum program can be conducted with a small group of children several times a week, over the school year.

Rationale:

Early Childhood Curriculum: A Piaget Program is based upon Piaget's developmental theory of the growth of intelligence. Thinking processes change during childhood, and the thinking of a four-year-old is qualitatively different from the thinking of a fourteen-year-old. It is not simply that the younger children know less; they do different things with what they know.

Preschool children are likely to be at a preoperational stage of thinking processes. They sort out what they see and begin to form classes and subclasses. They are developing notions of space and number, and of how the two are related. They begin to order things and events, to arrange them in a series from small to large, short to tall, first to last, or light to heavy. From this knowledge, the curriculum of this program was developed.

Early Childhood Curriculum: A Piaget Program is a curriculum based upon our knowledge of the step-by-step development in the areas of classification, space, number, and ordering. As children engage in activities in these areas, they will be assimilating new knowledge and changing old ideas, with the result that their thinking will become more logical.

Research or Evaluative Evidence:

This program has been evaluated with preschool children in University City Public Schools, Missouri, and in the Children's Centers at Oakland, California, with positive results. There were significant gains on Binet scores and on Piaget type tests where each was employed.

For Further Reading:

General discussion

Inhelder, B., and Piaget, J. *The early growth of logic in the child*. New York: Harper & Row, Inc., 1964

Bereiter, C., and Englemann, S. *Teaching disadvantaged children in the preschool*. Englewood Cliffs, New Jersey: Prentice Hall, 1966.

Theoretical discussion

Blank, M., and Solomon, F. A tutorial language program to develop abstract thinking in socially disadvantaged preschool children. *Child Development*, 1968, *39*, 379-390.

What: Educational Insights Boxes

Published By:
Educational Insights, Inc.
211 South Hindry Avenue
Inglewood, California 90301

How To Order:
Order from publisher.
List price: $5.95.
Consumable items: Optional student workbooks.

Description: Educational Insights Boxes offers exciting exercises in creative thinking for elementary school children. Games, activities, and skill builders are written on separate index cards; dividers for different sections are provided; the box doubles as a file. Boxes for five subject areas are available.

Target Audience: Grades 1-6.

Materials Provided: The Language Arts Box consists of 150 games, activities and skill builders. The lower grade level activities are found at the beginning of each section. There are eleven sections which include creative writing, organization aids for creative writing, manipulations, public speaking, dramatics, radio and television, informational writing, language skills, spelling, vocabulary development, and parts of speech.

Elementary Science Experiments consists of 135 experiments and activities. It contains twelve different sections dealing with magnetism, electricity, air, aerophysics, simple machines, weather, heat, water, chemistry, sound, light, and extra material. Student workbooks, at $1.50 each, and a teacher's edition, at $1.85, are available from publisher.

The Art Box contains creative art activities for the intermediate grades. Four different sections including a general introduction, behavioral objects, two-dimensional activities, and three-dimensional activities.

Write On! is a collection of 70 creative writing ideas and teacher techniques. The different sections deal with a writer's workshop, motivators, word power, flair for fantasy, holiday happenings, and potpourri.

Mind Expanders consists of challenging activities designed primarily for gifted students. They are to be used individually by the student. Six different areas are covered: math, creative writing, art, social studies, poetry and book reports, and science.

Teacher's Guide:

Each box contains an index card directed to the teacher. This card presents a general overview of each box and the activities provided.

Subject Matter and Teaching Strategy:

The activities, games, and skill builders can be used to supplement a classroom presentation of a subject area. The group as a whole may engage in the exercises, or each child can work independently. A teacher may expand the box by adding new activities.

Rationale:

The boxes offer creative and inviting activities. These activities provide students an opportunity to think and discover, and in this way, increase their knowledge of the subject area and their creative thinking abilities.

What: The Elementary Science Study Program (ESS)

Education Development Center, Inc.

Published By:
McGraw-Hill Book Company
Webster Division
30th Floor
1221 Avenue of the Americas
New York, New York 10020

How To Order:
Webster/McGraw-Hill
Educational Equipment Department
P.O. Box 965
Paoli, Pennsylvania 19301

List price: Each science activity kit with this program varies in price from $30.00 to $150.00 each. ESS Examination Package (order no. 07-079166-9) @ $4.77 provides a good overview of the series for the interested buyer.

Consumable items: Workbooks.

Description: The Elementary Science Study Program is an experience-oriented series of individual science kits which develop skills that are fundamental tools for all learning. Each unit or kit varies in subject matter, conception, and design. The units are open-ended, emphasizing imaginative uses for commonplace items--things like rubber bands, toothpicks, tin cans, soda straws, etc. The children carry out their own exciting investigations. Besides satisfying scientific requirements, ESS materials satisfy the imagination of children and enable the teacher to meet the need for them to know their world and cope with their environment.

Target Audience: Elementary grades.

Materials Provided: The ESS units provide materials with which the children carry out their own investigations. They are packaged in classroom kits appropriate for 30 children and in smaller kits for 6 children.

Worksheets and student booklets accompany each unit to guide the student in observations, assembling of equipment, or carrying out investigations. For many units a book which can be used by individual students for recording personal observations is provided. These workbooks provide the teacher with a handy source of student work to be evaluated.

Over 50 film loops, ranging from three to four minutes each, are available in this science program. They are designed so that even very young children can use them independently. Some units also include 16mm films. These enriching visual aids expand the children's understanding of a particular aspect of a unit.

Replacement packages are available for consumable items. Code numbers and prices can be found with the listing of components for each unit in the catalog provided by the publisher.

Example 1: In the kit entitled "Kitchen Physics," the student (grades 6-8) examines liquids to discover how they form drops and puddles; how they fall and bead up; how fast they move through various containers; how they gather, are absorbed, evaporate, and dissolve. Children build their own equipment to test and observe the nature of liquids under different circumstances. They learn to observe, question, predict, design and perform experiments, collect and analyze data, and operate much as the research scientist does. The objective of the unit is to allow the children to acquire an understanding of the world of science by being made aware of its operations and questions. The teacher's guide provides suggestions on the amount of time given to the activities in this unit.

The kit costs $22.95 and contains enough equipment for six students to perform their own experiments. Teacher's guide (@ $1.38) and worksheets (6 each of 8 worksheets @ $2.25) are ordered separately.

Example 2: Attribute Games and Problems is a non-graded activity to aid the child in developing thinking skills for solving problems of classification and the relationship between classes. The child's ability to generalize is also developed in this kit by encouraging him/her to apply a strategy learned in one context to a similar problem in a different context. This kit should intrigue both children and adults. The teacher's manual provides a reproduction of a series of problem cards which describe games and problems. Commentaries accompany each problem card reproduction and suggest extensions and alternatives for use with children of different ages.

Attribute Games and Problems provides work with problems that lend themselves to applications in many curriculum areas, especially where classification or relationships between classes are dealt with (eg. science, social studies, mathematics). The material kit (cost: $9.60) includes 32 differently shaped wooden blocks and various other matherials. In conjunction with the materials kit, there is one set of Problem Cards (cost: $7.11) which indicate sequential problems and activities for the unit; one set of gummed stickers (cost: $3.99) which can represent color blocks and cubes for mapping problems and making puzzle cards; and one teacher's manual (cost: $5.10).

Teacher's Guide:

The teacher's guide which accompanies each ESS unit provides helpful information and ideas on the preparation and follow through of each theme investigated by the pupil. Copies of pupil worksheets, descriptions of unit materials, background information on the unit, models for teaching, and illustrations of experiments are also provided in the manual.

Subject Matter and Teaching Strategy:

The Elementary Science Study Program consists of flexible, inquiry-oriented science units that can be used as a complete science program or as an enriching supplement to a program already in use. Each unit varies in subject matter, conception, and design. Some of the topics investigated are growing seeds, ice cubes, gases and "airs", eggs and tadpoles, daytime astronomy, changes, bones, batteries and bulbs, microgardening, optics, pendulums, printing, sand, and so on. The units are open-ended, emphasizing imaginative uses for commonplace items.

In each case, the pupil "learns by doing." Inquiry and discovery are important cognitive processes which are emphasized in these units. The units are flexible enough to be used for varying lengths of time in a range of grades.

Rationale:

The Elementary Science Study Program teaches children the skills that are fundamental in knowing scientific concepts. The children learn in a dramatic way by doing the experiments themselves. Each child learns how to use commonplace items in creative ways. Through experimentation and observation, the child is helped to understand in delightful ways highly sophisticated concepts. The child's powers of perception and reasoning abilities are thereby sharpened and expanded by these superior quality multi-media materials.

Research or Evaluative Evidence:

The Elementary Science Study Program has been evaluated extensively. More than a hundred educators have been involved in the conception and design of its units of study. At every stage of development, the ideas and materials of each unit were taken into actual classrooms, where children and teachers have also helped shape the form and content of each unit before they were released as a general science program.

For Further Reading:

General discussion

Schmidt, V. E., and Rockcastle, V. N. *Teaching science with everyday things*. New York: Webster/McGraw-Hill, 1968.

Theoretical discussion

Education Development Center. *Introduction to the elementary science study*. Pennsylvania: Webster/McGraw-Hill, 1972.

What: Experiences in Science (EIS

Harold E. Tannenbaum, Beulan Tannenbaum, Nathan Stillman, Myra Stillman

Published By:
McGraw-Hill Book Company
Webster Division
30th Floor
1221 Avenue of the Americas
New York, New York 10020

How To Order:
Webster/McGraw-Hill
P.O. Box 965
Paoli, Pennsylvania 19301
Include full title and code number. Additional information will be made available upon request to the publisher.
List price: Refer to "Materials Provided."
Consumable items: Recortexts. Some kit materials.

Description:

Experiences in Science is an exciting experience-centered program which builds upon children's natural curiosity, encouraging them to discover scientific facts about the world through their own explorations. With each unit of the program, children are encouraged to be true scientists. Each unit provides the children with the laboratory equipment they need to perform their own experiments and a record book to record the personal observations they make about them. Throughout each unit, each child is encouraged to give different interpretations to the phenomena being investigated.

Experiences in Science encompasses a broad range of topics (biological, physical, and earth sciences) with complete equipment packages.

Target Audience: Elementary grade levels 1-6.

Materials Provided:

Experiences in Science can be purchased as individual units, by Grade Class Kits (set of six units for use in one classroom only), or by Grade Kits (a complete set of materials for each grade).

Individual units consist of 30 Recortexts (a 20-48 page color activity book) @ $.48 to $.54 each, 1 teacher's manual @ $1.44 to $1.80 each, and 1 unit equipment kit @ $16.00 to $90.00 each. Sufficient materials for 30 pupils to perform experiments on the topic being investigated are provided.

Each individual unit consists of 7 to 13 lessons covering a five to six-week period. The individual units cover such diverse topics as magnets, earth and sun, light and shadow, sound, heat, plant and animal responses, solids, liquids, and gases, the continuity of life, the universe, color, and so on.

Unit 5, Grade 2, for example, explores the nature of air. It introduces the concept that even though air cannot be seen, it is all around us--exerting pressure and occupying space. During the course of the seven lessons covering a five-week period, the pupils discover that they can make a "hole" in water with air, discover that they can increase or decrease air pressure in a closed system by use of a balloon and a water tank, discover that air definitely occupies space and exerts pressure, and discover how to measure the strength and direction of wind by the use of pinwheels.

The equipment for this particular kit consists of work trays, air tank assembly packages, funnels, plastic containers, corks, porous material packages, balloons, plastic bags, flex and plastic straws, and pinwheel assembly packages. It costs $28.50. The Recortext (a 20-48 page color activity book) costs $1.48. It is recommended that, for a class or 30 pupils, 30 Recortexts be ordered. The teacher's manual costs $1.44. Replacement packages are also available.

Grade Class Kits (set of six units for use in one classroom only) contains all the equipment needed for the grade's six units (Grade Class Kit Unit Price: $195.00).

Complete Class Materials for Grade contains

1 Grade Class Kit (equipment), 30 each of the 6 Recortexts, and 1 each of the 6 Teacher's Manuals.

Kit prices do not include live specimens which should be ordered from local biological supply houses.

Teacher's Guide:

A teacher manual accompanies each of the six units in each grade and provides the teacher with activities which expand the topics under investigation. Activities are clearly described and equipment is carefully illustrated.

Subject Matter and Teaching Strategy:

Experiences in Science is a highly flexible program in elementary science which can provide a carefully structured, well-balanced science course for grades 1-6. Units may also be transposed, omitted, or integrated into an existing science program. *Experiences in Science* features an inquiry-discovery approach to learning to ensure creative involvement of the child.

Rationale:

Experiences in Science is based upon the belief that the most effective route to meaningful learning is to have each child participate in each experiment. This active participation gives the child a deeper understanding of scientific methods and scientific facts than could be learned from traditional books or demonstration approaches.

Research or Evaluative Evidence:

The authors of *Experiences in Science* have strong science teaching backgrounds at both the college and elementary levels. Thus they should have had appropriate experiences to help them develop an effective program.

For Further Reading:

General discussion

Schmidt, V. E., and Rockcastle, V. N. Teaching science with everyday things. New York: Webster/McGraw-Hill, 1968.

Rowe, M. B. Teaching science as continuous inquiry. New York: Webster/McGraw-Hill, 1973.

What: Exploring Feelings

Published By:
Paul S. Amidon, Inc.
5408 Chicago Avenue South
Minneapolis, Minnesota 55417

How To Order:
Order from publisher.
List price: $19.00.
Consumable items: Think Sheets.

Description:

Exploring Feelings is a kit that allows the child to explore the feelings of love, sorrow, anger, fear, concern and responsibility. This is accomplished by the use of art materials which also aid in the development of the students' creativity.

Target Audience: First grade.

Materials Provided:

One teacher's guide.

One vinyl loose leaf folder with eight pockets for storage.

Seventeen transparencies of various scenes usually involving interactions among children.

Thirty-nine Think Sheets.

Teacher's Guide:

Both sides of each page in the guide are devoted to one transparency and the related think sheets. The transparency and think sheets are pictured on each page of the teacher's guide. The goals of each transparency are also stated. Each page also contains questions and possible answers under three main interrogative headings: What do I see? What do I know about the feeling of ________?

(vis. whatever feeling is under study), and What shall I do? The rest of the information available is headed "further enrichment." This usually includes suggested drawing activities related to the transparency, and books, songs, poems, and fingerplays that may be used to supplement each activity.

Subject Matter and Teaching Strategy:

A transparency is shown to the class followed by discussion questions. Each transparency has two or three think sheets associated with it. They are the final step in the exploration of each feeling. After studying the transparencies, sharing their feelings and role playing some of their ideas, children are allowed to express some of their own conclusions with think sheets. The think sheets typically consist of a picture that must be developed and created by each student. The think sheets also have an ancillary role in that the children can share their explorations with their parents when they take their papers home.

The program involves verbal and physical expression, observation, analysis, drawing, and many other areas suggested by the variety of subjects in the think sheets and transparencies.

Rationale:

This kit is built upon the concept that creativity can be developed by having children explore and understand their own feelings, emotions and personal interactions.

What: Exploring World Regions

Follett Publishing Company

Published By:

Follett Publishing Company
1010 W. Washington Boulevard
Chicago, Illinois 60607

How To Order: Order from publisher.
(Prices individually listed under "Materials Provided.")
Consumable items: None.

Description: Exploring World Regions is a series of social studies textbooks which introduce social science content from an interdisciplinary perspective. Social science concepts are attractively presented in a well-designed format including many full-color maps and pictures. Care is taken to develop critical thinking, communication, research, interpretation, and map and globe skills. Throughout the book opportunities are structured so that students can be guided in the use of inquiry skills such as observation, classification, prediction, and evaluation. Problems are posed to stimulate ideas and deeper questioning. Experiments in social science are suggested and guided in detail.

Target Audience: Grades 5, 6, 7.

Materials Provided:

Exploring World Regions: Western Hemisphere; school price $6.15 (grade 5)
Exploring World Regions: Eastern Hemisphere; school price $6.57 (grades 6, 7)
Exploring World Regions: Latin America and Canada school price $6.57 (grades 6, 7)

The following materials are available to accompany each textbook:

Annotated Teacher's Edition; school price $7.98

Directed Activities; to be priced when published in 1975

Directed Activities Teacher's Edition; to be priced when published in 1975

Teacher's Guide:

The *Annotated Teacher's Edition* gives excellent aids to the teacher. An explanation of inquiry methods suggests procedures for aiding students in using the skills. Suggestions are given to help the teacher in individualizing instruction for her class. The teacher's aids include stated concepts, performance objectives, discussion helps, and suggestions for teaching.

Subject Matter and Teaching Strategy:

Each edition of this series provides content material in social studies for a complete grade level. Teachers using suggestions for individualizing the material would find the series a total program for the classroom. Enrichment activities included in the social studies program would add experience in language arts, art, and science.

Rationale:

Exploring World Regions was designed to provide content widely taught in upper elementary grades presented in a manner allowing for developmental levels of students at each grade level. An interdisciplinary content presents information from history, geography, sociology, anthropology, political science, economics, social psychology and the natural sciences. Content is presented in such a way that opportunities for problem-solving and using inquiry skills are maximized. Emphasis is placed on divergent and evaluative questions although factual questions are also included.

What:

The Five Sense Store:
The Aesthetic Education Program

Cemerel Inc.

Published By:

The Viking Press
Lincoln Center for the Performing Arts
625 Madison Ave.
New York, New York 10022

How To Order:

Order from publisher.
List price: Prices vary greatly; refer to catalog.
Consumable items: None.

Description:

The Aesthetic Education Program is a unique system of materials, media games, and viewpoints which assist students in developing feeling and aesthetic responses. Such techniques as creating characterization; working with tone, shape, sound, movement; constructing dramatic plot; and creating word pictures help students develop their aesthetic abilities.

Target Audience:

Grades K-12.

Materials Provided:

The materials vary with each kit. Everything from cameras and games to masks, rhythm blocks, magnetic tape and cartoons.

The available kits are

Examining Point of View
Creating Word Pictures
Relating Sound and Movement
Tone Color
Creating Characterization
Constructing Dramatic Plot
Shape
Shapes and Patterns
Shape Relationships
Rhythm/Meter

Teacher's Guide:

The Teacher's Guides in this series include notes regarding each concept in the student's books, objectives of the activities, and reduced reproductions of the pages of student books. Supplementary activities are also discussed. The Teacher's Guides are well illustrated and easy to use.

Rationale:

The *Aesthetic Education Program* provides guidance and experience in a wide variety of affective and aesthetic activities. The program uses the do and create approach. The activities require total involvement of the child including making decisions, developing ideas, and critical thinking.

Subject Matter and Teaching Strategy:

The program involves the development of creative skills in reading, analogies, perception, identification of shapes, color, patterns, dramatic plots, sound, and movement.

The Five Sense Store is effective in individualized and small group learning centers, as class projects, and as an integral part of a language or artistic skills program. Regardless of the way used, the *Aesthetic Education Program* serves as a valuable supplement to an educational program.

Research or Evaluative Evidence:

Testing is conducted in three different

socioeconomic settings throughout the country. Copies of research and evaluation reports are available by request.

What: The Fun Creative Writing Program

Published By:

Fun Publishing Company
P. O. Box 40283
Indianapolis, Indiana 46240

How To Order:

Order from publisher.

List price:

Complete Classroom Kits	$28.50
Fun Journals	$ 2.50
Professional Books	$ 3.00

Consumable items: Tests.

Description:

The Fun Creative Writing Program is not just a comprehensive creative writing program--it is also a creative experience. Through this program, the student learns to imagine, to organize, to write, to listen, to read, to observe, and to think.

Target Audience: Grades 1-8.

Materials Provided:

Classroom Kits (one kit for each grade level):

Studybook. A soft-covered book, with activities planned for one year. Provides the student with various inviting activities which help promote creative writing skills. 25 copies.

Comprehension test. Provides an evaluation of the student's understanding of the basic concepts and principles found in the studybook. 25 copies.

Answer key. Teacher's answer key for the comprehension test.

Classroom progress chart. When displayed in the classroom, each student is able to view his own progress in developing creative writing skills.

Emergency kit. Fifteen creative writing lessons, which help the teacher stress specific points. They may be duplicated or used on an overhead projector.

Picture pack. A number of pictures which offer possible article and story material.

Teacher's Manual.

Fun Journals. A collection of stories, poems, and articles written by children. Primary, intermediate, and junior high levels are available. Children using The Fun Creative Writing Program are encouraged to submit material for publication.

Professional Books. Books which answer questions concerning the teaching of creative writing. Two different books, one geared to elementary teaching, the other to junior high level, are available.

Teacher's Guide:

A teacher's manual is provided with each classroom kit. It contains simple lesson plans, ideas, and suggestions for motivating children to use the study books.

Subject Matter and Teaching Strategy:

The Fun Creative Writing Program may be used as a separate program, or adapted for use in existing school curricula. A single grade level may be used, or different levels introduced as the child progresses.

The program offers various activities which develop skills necessary for writing creatively. The teacher can use any of the materials separately, or he/she can present a lesson or activity from one of the materials and supplement it with the remaining materials. The teacher can also present an original idea or activity and then find related activities in the program.

Rationale: The Fun Creative Writing Program attempts to stimulate children's creative writing. It offers interesting activities which serve to improve skills necessary in writing. Children not only learn these skills, but their enjoyment of their own creativity will be enhanced.

What: Ginn Reading 360

Theodore Clymer, Senior Author

Published By:
Ginn and Company
191 Spring Street
Lexington, Massachusetts 02173

How To Order:
Customer Service
Ginn and Company
Xerox Education Center
P.O. Box 2649
Columbus, Ohio 43216
List price: Refer to "Materials Provided."
Consumable items: Handbooks.

Description: Ginn Reading 360 is a comprehensive basal reading program which seeks to develop four major aspects of reading: decoding, understanding the message, evaluating the message, and applying ideas gained through reading to reinforce knowledge, change behavior, and extend the message. Nine skills are emphasized. They are decoding, vocabulary, comprehension, creativity development, literary understanding and appreciation, language, study skills, sensitivity to social moral values, and acquisition of knowledge.

Textbooks for each of the fifteen levels are colorfully bound and have interesting covers. Each book is an anthology of stories selected to vary in style, setting, and values. A high standard of literary value has been maintained. Stories feature urban, suburban and rural characters of many races. Many stories are illustrated with pictures showing children of several races interacting. Stories for each level present sentence patterns which are likely to appear in the language production of children at that level.

Development of students' creativity is encouraged through the use of open-end selections and questions throughout the texts. For instance, one story tells of a boy's experiments, but does not give results or explanations. Cover and story illustrations and suggested activities have also been designed to create the students' need to question and search further for information. One story shows a "picture" of himself that a boy has brought to school, but does not explain that the picture is an x-ray. Besides these specific features which enhance development of creativity, divergent tasks have been included in the functional aspects of other activities. Discovery pages, double page spreads of illustrations which are background information sources, are also designed to create the desire to explore beyond what is given. Opportunities are given for students to experiment with creative writing in response to particular pictures or ideas.

Target Audience: Grades K-8.

Materials Provided: A Ginn Reading 360 textbook for each level, levels 3 through 13, presents stories in many styles, poems, colorful and meaningful illustrations, and evaluation-activity pages.

Textbooks on levels 5 through 15 also offer a longer story selection. An *Annotated Teacher's Edition* is available for each student text. Correlated materials for each text include a *Skills* Handbook and a *Self Help Activities* book for levels 5 through 15. For each of these a teacher's guide is available at the same price. Other materials include Spirit Duplication Masters, tests and card sets. Basic materials available for level 3 through 13 are listed below.

Level 3 - *A Duck is a Duck* $1.29
Annotated Teacher's Edition $4.29
Skills Handbook (workbook for levels 3 and 4) $1.05

Level 4 - *Helicopters and Gingerbread* $1.29

Level 5 - *May I Come In?* $2.25
Annotated Teacher's Edition $4.29
Skills Handbook $1.08
Self-Help Activities $.69

Level 6 - *Seven is Magic* $2.88
Annotated Teacher's Edition $4.29
Skills Handbook $1.11
Self-Help Activities $.69

Level 7 - *The Dog Next Door and Other Stories* $3.12
Annotated Teacher's Edition $4.29
Skills Handbook $1.14
Self-Help Activities $.69

Level 8 - *How is it Nowadays* $3.21
Annotated Teacher's Edition $4.29
Skills Handbook $1.14
Self-Help Activities $.69

Level 9 - *With Skies and Wings* $3.27
Annotated Teacher's Edition $4.29

Skills Handbook $1.14
Self-Help Activities $.69

Level 10 - All Sorts of Things $3.27
Annotated Teacher's Edition $4.29
Skills Handbook $1.14
Self-Help Activities $.69

Level 11 - The Sun that Warms $4.08
Teacher's Guide $4.29
Skills Handbook $1.17
Self-Help Activities $.99

Level 12 - On the Edge $4.29
Teacher's Guide $4.29
Skills Handbook $1.17
Self-Help Activities $.99

Level 13 - To Turn a Stone $4.29
Teacher's Guide $4.29
Skills Handbook $1.17
Self-Help Activities $.99

Level 1 - Learning About Sounds and Letters $62.25
This kit is available for level one. It contains four sets of plastic alphabet graphemes, fifty picture/word cards, a display board, fifty duplicating masters, two records and a Teacher's Guide.
Studybook: Learning About Sound and Letters (consumable) $1.38
Teacher's Edition $.87

Level 2 - My Sound and Word Book (consumable) $1.56
Annotated Teacher's Edition $2.10
Practice Book $.87
Teacher's Edition $.87

Five texts with teacher's guides are available for levels 15 and 16. They are sold in packages of five. Each package of five texts is priced at $6.03. An Annotated Teacher's Edition for each text costs $1.62. A listing of titles follows.

Level 14 - Conflicts
Awakenings
Changes
Failures
Speculations

Level 15 - Rebels
Questions
Directions
Pursuits
Forecasts

There are two supplementary series which can accompany Ginn Reading 360. Read Better--Learn More is a program of consumable textbooks which are designed to build skills in the content fields of mathematics, science and social studies. Reading ability, special vocabulary, and critical thinking skills are emphasized. This program is designed to be completely individualized.

Magic Circle Books are supplementary books for kindergarten through third grade. Each is an original, full-length children's story.

Teacher's Guide:

Ginn Reading 360 Annotated Teachers' Editions provide excellent guides for teachers using Reading 360. The guides contain background information on linguistics and suggestions for teachers to use in developing students' creativity. These suggestions include a listing of strategies for creating incompleteness, an explanation of techniques used to heighten readers' anticipation of the story, and examples of making the familiar strange and the strange familiar. Lesson plans list new words, describe skills to be emphasized and state specific objectives. Special materials, techniques for motivation, and language activities are also included. Strategies for evaluating students and providing for individualization are also presented in the teacher's guide.

Subject Matter and Teaching Strategy:

Ginn Reading 360 is a basal series that can be used over a wide range of student abilities and backgrounds. Care has been taken to include stories from urban, suburban, and rural areas. Stories and pictures included feature characters of many races and cultures. The books are ungraded and can best be used in a classroom where reading is taught in small groups or is individualized so that each student can be placed in the level best-suited for him/her. The Annotated Teacher's Edition for each text provides suggestions for individualization and enrichment activities. Skill Handbooks and Self-Help Activities can also be used individually. A bibliography for each story is presented in the Annotated Teacher's Editions. Books listed on this bibliography may be used in many ways to increase individualization of reading instruction.

Rationale:

Ginn Reading 360 provides a basal reading series which emphasizes decoding, grasping the author's message and evaluating his message. A definite emphasis is also placed on encouraging application and extension of ideas gained through reading. This emphasis is carried through by providing experience in forming inferences and in manipulating ideas creatively. Incompleteness is seen as the motivating force for creative behavior. Stories, illustration, cover designs and teaching activities are all designed to maximize the effects of incompleteness.

For Further Reading:

Background reading

Parnes, S. J. Creative behavior guidebook. New York: Charles Scribner's, 1967.

Torrance, E. P. Guiding creative talent. Englewood Cliffs, New Jersey: Prentice-Hall, 1962.

Guilford, J. P. Frontiers in thinking that teachers should know about. Reading Teacher, 1960, 13, 176-182.

What: How Can I Tell You

Published By:

National Instructional Television Center
Box A
Bloomington, Indiana 47401
Telephone 812-339-2203

How To Order:

Preview materials containing one or more pre-selected lessons are available without charge except for return postage.
List price: Rental fees range from $32.00 plus $1.40 per 10,000 students up to 250,000 plus $.50 for each additional 10,000 students.

Films are rented from NIT by local educational television stations to be broadcasted open-circuit from their stations. In addition to contract costs charged to the schools who are entitled to view these programs (usually a cost per student or per teacher viewing the programs), the schools must provide the television sets. As part of the contract, some stations provide all manuals. Station broadcasts of the program are on a one time only basis and every classroom must watch the broadcasts at the same time.

or

Films are rented from NIT by a school district which contracts a television station to broadcast a particular film on closed-circuit. The school district buys the manuals (reusable) at a cost of $1.00 each (1-9), $.60 each (10-499), or $.54 each (500 and over). The school district pays a yearly rental fee based on total K-12 student population, cost for manuals, and contract costs.

Description:

How Can I Tell You is a unique television course of imaginative open-ended stories designed to release the creative ability and sensitivities of children. How Can I Tell You consists of fifteen 15-minute language arts programs for grades 1-6. The first five programs are open-ended stories (with drawings, narration, music, and sound effects) designed to stimulate imaginative verbal responses from children. The next four programs are theatre pieces performed by a professional theatre company designed to stimulate creative body movement. These programs focus specifically on perception: sight, smell, taste, touch, and sound, and ways to develop awareness. Warm-ups, exercise-games, and improvisations that can be used to extend perception of any subject in the classroom are also used. The final six programs are performances by another professional theatre company. These remaining programs emphasize pantomime, storytelling and music.

How Can I Tell You is designed to stimulate creative dramatics, creative body rhythms, nonverbal communication, creative writing, and group discussion among students. The first program opens, for example, with the story of a giant named Sam who inadvertently finds himself at the North Pole and has to find something to do for seven days. Drawings of what the television class thought happened to Sam during the seven days are shown with a narration by a student. The program closes with an invitation to the viewers to express what they think happened to Sam during those seven days. Each child's drawing can be used as a starting point for group discussion. Verbal explanation is encouraged and elaboration of visual material by sharing pictures is stimulated. Additional activities are suggested by the teacher's manual which accompanies the course.

Target Audience: Grades 1-6.

Materials Provided: None.

Teacher's Guide: The teacher's manual ($1.00 each for 1-9 copies; $.60 each for 10-499 copies; $.54 each for 500 and over) provides background information on each program of the series and the behavioral objectives of the programs. The manual also describes the activities, the materials to be used, the responses to expect from the children, and it suggests further activities which can be done to augment the learning experiences of each lesson.

Subject Matter and Teaching Strategy: How Can I Tell You is a televised language arts program for grades 1-6. The subject areas of the series are dramatics, art, music, pantomime, improvisation, creative writing, and drawing. Skills of successful discourse (eg. turn-taking, listening, concentrating, responding, etc.) are also developed.

How Can I Tell You was conceived as a stimulant and model to encourage a student's desire to express himself/herself in a variety of ways. Experimentation is encouraged. The atmosphere of each program is intended to be happy, warm, and relaxed.

Rationale:

The series was conceived to open up and strengthen verbal and nonverbal creative communication in children through their enjoyment and active participation in pantomime, improvisation, drawing, and storytelling. Creative writing, storytelling, and dramatics are used as expressions of what the student feels. As stimulants and models, each program of the series gives students many opportunities to experience the joy of spontaneous expression.

Research or Evaluative Evidence:

NIT worked closely with content specialists, teachers and students, educational administrators, broadcasters, and national professional associations in the planning and production of this series. How Can I Tell You has been used in many schools in Boston, Massachusetts, with positive results. The series was produced for The 21 Inch Classroom by WGBH, Boston.

For Further Reading:

General discussion

Moffett, J. Drama: What is happening: The use of dramatic activities in the teaching of English. (National Council of Teachers of English, 1967)

Moffett, J. A student-centered language arts curriculum, grades K-6: A handbook for teachers. Boston: Houghton Mifflin Company, 1968.

Spolin, V. Improvisation for the theatre: A handbook of teaching and directing technique. Chicago: Northwestern University Press, 1963.

What: _Ideabooks_

R. E. Myers and E. Paul Torrance

Published By: Ginn and Company
Statler Building
Boston, Massachusetts 02154

How To Order: Order from publisher.
List price: Ideabooks @ $.72-.75.
Teacher's Guides @ $.63-.69.
Consumable items: Ideabooks.

Description:

The _Ideabooks_ are a unique contribution to any classroom. They are designed to involve pupils in activities which require them to be both receptive to and critical of their own ideas and those of others, to analyze problems, to elaborate ideas, to explore possibilities, and to see relationships. Plenty of room is provided in each workbook for the pupil to work out his ideas.

Can You Imagine?--the _Ideabook_ for grades 1 and 2--contains units of imaginative and thought-provoking exercises for children. Exercises in seeing relationships, exploring possibilities, analyzing ideas and elements, and elaboration abound in _Can You Imagine?_ Questions are used to open the imagination of the children. Through the questions and suggested activities learning becomes fun and children make good progress in basic reading and writing skills.

For Those Who Wonder presents 22 units of challenging ideas for use in grades 3 or 4. This ideabook has been created to help keep children's need to wonder alive and to aid teachers in respecting the child's right to wonder. This sense of wonder is what is called "curiosity." _For Those Who Wonder_ challenges the student with a series of questions such as "What could happen if cars never wore out? Why is a middle-aged woman like a snowshoe rabbit? Is a month a mile?

where does the cold go?" There is no single answer to these questions and no special need to use this ideabook in a prescribed manner. Throughout the series, the teacher is encouraged to modify any exercise to suit the interests and needs of the pupils.

Invitation to Thinking and Doing, for grades 4-6, offers 24 training exercises in exploring, questioning, experimenting, imagining, testing, and modifying that can be expected to increase creative thinking in almost any curricular field--language arts, science, mathematics, social studies, reading. Each unit is designed to challenge the pupil and cause him to puzzle or to search.

The exercises in Invitation to Speaking and Writing Creatively, grades 6-8, involve pupils in one or more creative activites of the language arts. Any one of the 21 units will involve the pupil in seeing relationships, elaborating, combining ideas and elements, being sensitive and aware, or exploring possibilities. These exercises should be effective in promoting the creative writing of children. Each exercise is intended to encourage pupils to think and write without being threatened by grades or by time. Suggestions are offered on how these exercises could profitably be used in conjunction with the school's language arts program.

Plots, Puzzles and Ploys, for grades 7-8, is a sequence of 23 exercises designed to launch pupils on adventures of self-expression--thrusting them right into the business of writing a story. Puzzles, riddles, and mysteries are the devices which this Ideabook uses to challenge the thinking of the pupils and to heighten their anticipation in each exercise. Flexible and fluent thinking is emphasized throughout each unit. Analogies, similes, and metaphors are just a few of the literary concepts that are investigated.

Target Audience: Elementary and junior high school grade levels.

Materials Provided: The Ideabook series consists of five Ideabooks with a teacher's guide accompanying each Ideabook. Each Ideabook is in a workbook format and provides plenty of room for the pupil to work out ideas.

Teacher's Guide:

There is a separate teacher's guide for each of the Ideabooks. Each guide provides the teacher with suggestions on how to teach each unit. The authors stress the importance of creating a climate in which a child can think without inhibitions or restrictions. Each unit tells how to set the stage for the lesson, how to present the lesson, how to evaluate children's responses, and gives further activities that might be done to "follow through" on the learning experiences of the completed lesson.

Subject Matter and Teaching Strategy:

The Ideabook series deals with the creative thinking abilities of children. The materials in this series attempt to engage children in a sequence of creative thinking activities, leading to increasingly higher stages of thinking. They can be used profitably with language arts instruction. However, they are not confined solely to this subject matter area and the skills which they encourage can be applied to the areas of science, social studies, and social values.

The Ideabooks foster fluency and flexibility of thought. Pupils are encouraged to see relationships between things, to notice similarities and dissimilarities in events and places, to elaborate upon a simple idea, or to relate one idea to another.

Rationale:

The Ideabooks develop creative thinking abilities in children. Creativity is defined as a natural human process which emerges out of the tension of inquiry. The "need" to find out, to discover the reason, to get the point, to understand, to know "why" is the fertile ground out of which creative thought emerges. Sensitivity to problems, ideational fluency, flexibility, originality, elaboration, and redefinition are a few of the abilities that are developed in the Ideabook series.

Research or Evaluative Evidence:

The materials in the Ideabooks have been positively evaluated in several projects. R. J. Britton (1967), Director of Research for the Henrico County Public Schools of Virginia, evaluated the creative thinking exercises contained in Invitations to Thinking and Doing in seven classes of sixth-grade pupils. Significant differences in both total verbal and total nonverbal areas of creativity in favor of the experimental group were shown when measured by the Minnesota Tests of Creativity.

Ann M. Casey (1965) taught exercises from

Invitations to Thinking and Doing for one half-hour every day for two weeks. An experimental group was shown to be significantly more fluent, more flexible, and more original than a control group which received no instruction.

For Further Reading:

Theoretical discussion

Britton, R. J. A study of creativity in selected sixth grade groups. Doctoral dissertation, University of Virginia, Charlottesville, 1967.

Casey, A. M. The effects of using a workbook approach in teaching divergent thinking in sixth grade pupils. Master's thesis, Cornell University, Ithaca, New York, 1965.

Hutchinson, W. L. Creative and productive thinking in the classroom. Doctoral dissertation, University of Utah, Salt Lake City, 1963.

General discussion

Torrance, E. Paul and Myers, R. E. Creative Learning and Teaching. New York: Dodd, Mead and Company, 1970.

What: *Images and Imagination: Seeing Creatively*

Michael Siegel

Published By:
Eye Gate House Incorporated
146-01 Archer Avenue
Jamaica, New York 11435

How To Order:
Order from publisher.
List price: $39.75.
Consumable items: None.

Description: *Images and Imagination* is a series of four filmstrips and accompanying records or cassettes. It presents a collection of images that are designed to stimulate students to see creatively and attend more closely to the world around them. The images are of objects and places that are familiar, but the camera lingers on those scenes of junkyards, windows, and sidewalks, and allows one to really see and to feel those "familiar" objects in new ways. The emphasis is on the appreciation of the marvelous visual displays of everyday life, and the cultivation of imagination and expression that can arise from such appreciation. Such expression can be a part of many areas of study, including language arts, humanities, photography and art.

Target Audience: Grades 4-8 and high school.

Materials Provided: 4 filmstrips:
A. *Picture Window*
B. *Strange Country*
C. *Sidewalk*
D. *Reflections of New York*

2 Accompanying Cassettes or Records

Teacher's Manual

Teacher's Guide:

The Teacher's Manual introduces the rationale and objectives of the series, and suggests classroom applications for each filmstrip.

Subject Matter and Teaching Strategy:

The suggestions for applications of the series all relate to using the presentations as stimuli to excite the imagination, expression, and creativity of students. Because the images are of such a general nature, they enjoy a wide applicability to any subject area that relates to visual imagery and expression. Such areas are the graphic arts, photography, and language arts. Some of the content may be useful as discussion material in the humanities and social studies.

The series may be used by individuals in a learning center, with small groups, or with an entire class. Filmstrips may be easily shown to a large group to generate discussion, and to provide a basis for individual interpretations and reactions.

Rationale:

Images and Imagination: Seeing Creatively is designed to develop students' appreciation and individual responses to the visual world.

The richness and satisfaction of really perceiving that world, and the perceptions, feelings, and creative responses that it can foster are the elements that the series focuses upon.

What:

Imagination Express: Saturday Subway Ride

Gary R. Davis and Gerald DiPego

Published By:

D.O.K. Publishers, Inc.
771 East Delavan Avenue
Buffalo, New York 14215

How To Order:

Order from publisher.
List price: $3.95
Consumable items: Detachable master maker sheets to be used with spirit masters or mimeo stencils.

Description:

The *Imagination Express: Saturday Subway Ride* is an imaginative 92-page workbook in a travel story-exercise format designed to teach creative thinking techniques and positive attitudes toward creativity. Each pupil buys a ticket for the Imagination Express by paying with a song or story or whatever other imaginative thing he can create and then it is "All Aboard" for a wild, fun-filled adventure which takes him from Kansas City to Pittsburg to Dublin to Tokyo to Santa Monica and back. Just like Alice in Wonderland, the pupil will meet strange and wonderful people and places, experience the fun of creating fantastic happenings and solve interesting problems in the *Saturday Subway Ride*.

Target Audience:

The workbook was specifically designed to be used over a two-to-four month period with intermediate (3-8) grade level pupils.

Materials Provided:

One story booklet. This booklet contains seven stories based upon an imaginative subway ride from Kansas to Dublin and back again.

Eighteen Master Sheets. These detachable sheets provide exercises in flexible, fluent and elaborative thinking which are used in conjunction with the story booklet.

Teacher's Guide:

Imagination Express is intended to be a "point of departure" for elementary grade teachers to begin a new kind of thinking about instructional planning and materials. Imagination Express is a valuable resource of ideas for the enthusiastic teacher in fostering creativity in students.

Subject Matter and Teaching Strategy:

Imagination Express provides practice in verbal expression and in creative writing. The story-theme is an around-the-world subway ride with fantastic episodes at each stop, some of which are supplied by the pupil.

Throughout the course of the journey, the pupil is encouraged to demonstrate his understanding of five creative problem-solving techniques by means of the pertinent workbook exercises presented throughout the text. The student learns to identify important attributes or parts of an object, considering each attribute as a source of potential improvement. Students consider each item on a prepared list as a possible source of innovation with respect to a given problem. By means of a metaphorical activity, students are asked to consider how other people, animals, and plants solve a similar problem. Groups of students use the "brainstorming" technique to find solutions for problems such as "how to turn a classroom into a foreign planet."

The practice activities given in the workbook should help pupils develop verbal fluency and imaginative writing skills.

Rationale:

The Imagination Express: Saturday Subway Ride was intended to stimulate the creative problem solving ability of pupils by fostering a favorable predisposition toward "wild" or imaginative ideas. It is possible to learn to be a more productive and more original thinker by focusing upon the development of strategies of thinking which facilitate the generation of ideas. A child's creative ability can be improved through practice with the techniques of generating new ideas.

The creative development of children depends largely upon the sensitivity and imagination of teachers and curriculum developers. Imagination Express encourages the teacher to find new and different experiences for children.

Research or
Evaluative
Evidence:

A pilot study undertaken by the Wisconsin Research and Development Center for Cognitive Learning evaluated the usability of the *Imagination Express: Saturday Subway Ride* with 61 sixth graders and 34 fifth graders at two Wisconsin schools. Results indicated that pupils demonstrated understanding of the creative problem solving techniques presented in the text. The attitudes of pupils toward creative ideas and endeavor improved, verbal fluency increased, and pupil's writing skills became imaginative.

What: Imagine and Write: My Weekly Reader Creative Expression Series

Published By:
American Education Publications
55 High Street
Middletown, Connecticut 06457

How To Order:
Order from: Xerox Education Publications
Education Center
Columbus, Ohio 43216
List price: Pupil's book for each grade costs $.25 each. The Teacher's Guide and a desk copy of the pupil book are free with every order for 10 or more books at one grade level.
Consumable items: Pupil's books.

Description:

My Weekly Reader Creative Expression Series consists of vivid, colorful, creative writing booklets designed to aid elementary school teachers in stimulating and channeling children's imagination and creativity through written work. Vocabulary and literature skills are developed through each book of the Imagine and Write series with emphasis upon the unique creative expression of each child. Each child is the "author and editor" of his/her own workbook. Through the development of ideas the child develops a sense of pride in writing, knowing that he/she is free to develop ideas.

Provocative pictures, open-ended questions, unfinished stories and poems, stories and plot outlines provide the stimuli for the child in each book. Practice in the use of various literary techniques is provided. Imagination and thought are focused upon single ideas in each book. Checklists to aid the child evaluate and edit work are also included.

Target Audience: Elementary grades 2-6.

Materials Provided: The Imagine and Write program includes five 48-page books and a Teacher's Guide.

The Pupil's Book provides pictures, open-ended questions, unfinished stories and poems, and ideas for plots. Practice is provided for the use of different literary techniques and activities that focus attention on word usage. The title "The Unexpected Visitor", for example, offers a range of choice in story plot and stimulates creative thinking.

Teacher's Guide: The Teacher's Guide which accompanies each book of the series gives the teacher a wealth of ideas for the successful stimulation of a pupil's creative ability. Creative writing is defined and suggestions are offered on how to make the learning environment which the teacher provides favorable to the creative functioning of pupils. The teacher's guide suggests the use of children's literature as background material for the various activities in the pupil's booklet. It offers a carefully constructed program of skill development with an analysis of writing forms and literary techniques. Class activities oriented toward the building of vocabulary and selectivity in word usage are also suggested. Ways of evaluating creative writing are also pointed out in the teacher's guide. Finally, a step-by-step guided lesson plan for each page in the pupil's Imagine and Write workbook is included.

Subject Matter and Teaching Strategy: Imagine and Write is an extension of the language arts program which is presented each week in My Weekly Reader. Each separate book for each grade (2-6) works to develop creative writing in children. Vocabulary and various literature skills (e.g. reading, identifying elements of a story, etc.) are carefully developed and channeled into the children's personal, individual written work.

Rationale: Imagine and Write is a program in creative writing. The series is built on the belief that creative writing should be the unique expression of a child's own feelings, thoughts, and imagination. Creativity, in this sense, is possessed by all children. In a favorable, nurtured environment, these ideas can be expressed in writing. Diversity in form, idea, content, and length is to be encouraged and respected. Creative writing is fun and it is personal. The authors believe that all children have past experiences upon which they can draw in their writing. Children need encouragement to draw upon these ideas and they need guidance in becoming motivated to write.

To develop their potential capabilities, children must be given the opportunity to think, imagine, and produce creatively. Creative writing is possible given a favorable physical and emotional environment. This series offers abundant opportunities for children to develop their creative abilities.

What: *Imagine That*

Published By:

National Instructional Television Center
Box A
Bloomington, Indiana 47401
Telephone 812-339-2203

How To Order:

Preview materials can be provided from the publisher. These contain one or more pre-selected lessons and are available without charge except for return postage.

List price: Rental fee for each televised lesson ranges from $37.50 plus $1.40 per 10,000 students up to 250,000 plus $.50 for each additional 10,000 students.

Films can be rented from NIT by a local educational television station to be broadcasted open-circuit from the station. In addition to contract costs charged to the schools who are entitled to view these programs (usually a cost per student or per teacher viewing the programs), the school must provide television sets. As part of the contract, some stations provide all student manuals. Station broadcast of the programs is on a one time basis and every classroom must watch the broadcasts at the same time.

or

Films can be rented from NIT by a school district which contracts a television station to broadcast a particular film on closed-circuit. The school district buys the student manuals (reusable) at a cost of $1.00 each (1-9), $.50 each (10-499), or rental fee based upon total K-12 student population, costs for manuals, and contract costs.

Consumable items: None.

Description:

Imagine that you are a magic carpet in the Land of Alladin. Imagine that you are a sunflower seed growing in the Land of Oz. Imagine that you are fire, bursting up and up on a cold, wintery, starry night in a desert region of Arizona. *Imagine That* lets your children be all these things and more. _Imagine That_ is a television course in creative dramatics for the primary grades that encourages children to express their ideas, reactions and responses to a story or subject--to feel it, to think creatively and freely about it, to identify with it, and then to enrich it with limitless imagination.

Imagine That is also a course in literature which uses folklore, fairy tales, poetry, fables, and other well-known stories of imagination as its source for motivating children to create and respond spontaneously.

As guide and director the teacher aids and encourages children to develop ideas freely and imaginatively. Children give form to their unique interpretations of the subject matter by acting them out in characterization and dialogue. At the end of the session, each child evaluates his/her own performance and those of his/her classmates in a simple and honest manner--learning valuable language skills in the process.

Imagine That offers a unique opportunity for the creative expression of the mental, spiritual, physical, emotional and social needs of children. Their senses are stimulated as they respond to their own creative interpretations of a well-known story through body movement. Imagination and verbal skills are exercised as they discuss their ideas and act them out with classmates.

Target Audience: Grades 1-2.

Materials Provided: Imagine That is a televised course which consists of 15 lessons. The first three lessons (Mother Goose, Three Billy Goats Gruff, and Peter Rabbit) introduce the technique and approaches of creative dramatics. The next three lessons focus upon sensory skills and sensory awareness (Poetry, Winnie the Pooh, and Aesop). Lessons 5 to 15 are devoted to characterization and simple scenes that can be adapted to suit the level of the class. A 30-minute teacher program accompanies the course to orient the teacher to the goals and to provide suggestions for extending or altering the programs to fit the class.

Teacher's Guide: The teacher's manual provides orienting information on each particular lesson--the background of the story to be presented, the behavioral objectives for the lesson, ideas to be developed in the classroom during the lesson, and guidelines to make the evaluation process an enriching experience.

Subject Matter and Teaching Strategy: The subject matter is children's literature and creative dramatics. Each lesson provides the starting point for the arousal of ideas which are portrayed through emotional and physical responses. The authors recommend that the classroom atmosphere remain free and easy with an absence of criticism and a lavish use of priase. A feeling of acceptance is very important to elicit free experience.

The programs should be viewed in a large open space. The children should be free to get up and move in response to the television teacher. Before each lesson, the teacher should warm up the children to the story by asking stimulating questions, such as, "What do you think the Second Billy Goat looks like?", "How do you think he feels when he hears a troll?", "What does he say to the troll?" When the children are motivated and excited to play, the dramatization begins and the children become the idea or ideas. Lessons begin with group pantomime and move to simple characterization. From characterization, they progress to one or two children interacting in a single scene. Each child is a source of ideas which, when developed and elaborated upon, can be creatively expressed in dramatic skill by the rest of the class.

Rationale: This program is designed to develop high appreciation of art and language through the framework of dramatization. It stimulates the senses and encourages the child to see, to feel, to listen, and to smell with new awareness. No props, scripts or costumes are needed. All that is needed is the child's imagination and relaxed atmosphere in which to act out the imaginings. Withdrawn, shy, lonely children will find opportunities to express their own personalities in creative ways. Aggressive children should be able to channel and control their energies in acceptable ways. Each child's unique interpretation of a story can emerge and be elaborated upon. Dialogue comes naturally. In this way, children come to a higher appreciation of the art and the language skills necessary to communicate their own unique physical and emotional interpretation of a story.

Research or Evaluative Evidence:

NIT works closely with specialists, administrations and professional groups in education in the development of all its programs.

For Further Reading:

General Discussion

Mearns, H. Creative power. New York: Dover Publications, 1958.

What: Instructional Fair Materials

Published By:

Instructional Fair, Inc.
4158 Lake Michigan Drive
Grand Rapids, Michigan 4950

How To Order:

Order from publisher.
List price: Duplicating Masters Texts - $4.95 each
Task Card Kits - $2.50 each
Enrichment Texts - various prices
Consumable items: None.

Description:

Instructional Fair Materials present the student with a number of related activities, each designed for a particular objective. The activities serve to further a child's understanding in a number of subject areas, help to increase motor-coordination and other developmental skills, and develop creative abilities.

Target Audience: Pre-school/Kindergarten and Elementary Grades.

Materials Provided:

Duplicating Masters Texts. There are 25-35 duplicating masters in each text. Each master is intended to produce at least 200 legible copies. The separate texts provided for various subject areas are: creative writing, critical incident writing, creative reading, arithmetic, social studies, vocabulary builders, and general enrichment masters. Teacher instructions are included.

Enrichment Texts. Varied activities are offered covering three subject areas at all elementary grade levels: creative enrichment, animated enrichment, and early childhood skill development.

Task Card Series. Four different series which develop varied concepts and skills are offered: (1) Comprehension and vocabulary development series (includes 32 task cards for upper elementary grade levels), (2) Phonics task series (includes 16 task cards for early elementary grade levels), (3) Metrics task series (includes 32 task cards for all elementary grade levels), and (4) General task series (includes 32 task cards for all elementary grade levels).

Teacher's Guide:

Duplicating Masters Texts. General directions for using the duplicating masters are printed on the inside front cover. An introductory explanation to the teacher contains suggested activities as well as skill and concept objectives reached by the text.

Enrichment Texts. A general overview of the use of objectives of the text is given in the beginning of the text. Suggested activities are found throughout each text.

Task Card Series. Two cards which indicate the content of the individual packet and give definitions and examples of the content are included.

Subject Matter and Teaching Strategy:

The activities presented by the duplicating masters, enrichment texts, and task cards can be integrated into the regular curriculum or used as supplementary exercises.

Students may use the texts or task cards individually, or the teacher may present them to the whole group.

Rationale:

Specific activities to induce creative writing, reading and projects are offered. All the activities are presented in the form of cartoon characters and word and number games which act as secondary stimuli to students' attention and motivate them to perform the primary task. Through the tasks students learn skills and concepts of several subject areas such as language arts and mathematics.

What: *Keys to Understanding Mankind*

Edited by Sandra Nina Kaplan and Jo Ann Butom Kaplan

Published By:

Creative Teaching Press
514 Hermosa Vista Avenue
Monterey Park, California 91754

How To Order:

Order from publisher.
List price: $5.95.
Consumable items: None.

Description:

Keys to Understanding Mankind is a set of reading-oriented, open-ended activities. There are 55 Keys that unlock an idea about man in relation to himself and others. Each key idea is followed by a list of activities which guide children in investigating the idea. For each idea there is an illustration which expresses the thinking structure involved in the idea. Some of the key ideas are the following: There is a reason for all behavior; Every issue has two sides; and Courage can be defined.

The directing activities suggest using the characters and elements of stories to demonstrate the ideas and investigate them.

Target Audience: Grades 4-12.

Materials Provided:

Fifty-five keys on heavy paper.
Teacher's Guide.

Teacher's Guide:

The kit is introduced by a statement of the objectives of the series. There are suggestions for the teacher that include an explanation of the use of the cards.

Subject Matter and Teaching Strategy:

The Keys may be useful in the classroom as a way of interpreting assigned reading material or as a basis for extra-credit work. A single card could be assigned to one student, to small groups, or to an entire class.

When kept in a learning center, the series could serve as an enrichment program in language arts or social sciences.

Rationale:

Keys to Understanding Mankind is based upon the belief that by encouraging students to investigate and discover, their individual expressive and thinking abilities can be developed and enhanced.

What:

Language for Daily Use

Harbrace Edition, Revised
Harcourt, Brace, & World

Published By:

Harcourt, Brace and World, Inc.
755 Third Avenue
New York, New York 10017

How To Order:

Order from publisher. Regional offices:
757 Third Avenue, New York, NY 10017
7555 Caldwell Avenue, Chicago, IL 60618
Polk & Geary Streets, San Francisco, CA 94109
1372 Peachtree Street, N.E., Atlanta, GA 30309
1640 Harry Hines Boulevard, Dallas, TX 75232
List price: Prices vary. Consult catalog.
Consumable items: Workbooks, some texts.

Description:

Language for Daily Use is a basic language arts series which presents a flexible program emphasizing writing, listening, speaking, mechanics, usage and literature. Writing instruction is designed in small parts which call for increasingly more student originality and creativity. Creative writing activities, such as haiku, are included along with work on reports, stories, new articles, and letters. Literature topics present poems, stories, fables, legends, and tall tales. Opportunities are structured for students to participate in creative dramatics. Reviews of well-known and favorite children's books are also included. A study of the history of the language includes history of names, history of spelling, spelling helps, and sentence patterns. Drills and exercises teach enunciation, articulation and mechanics.

Language for Daily Use is based on principles of child development. Inductive teaching, which guides children in discovering ideas for themselves, presents a model, example, or a picture which students analyze. The students' discovery follows a discussion led by the teacher. Practice exercises are designed to follow the discovery and a statement of the generalization.

Target Audience: Grades K-8.

Materials Provided: A paperback oral language book, _Let's Talk and Listen_, presents attractive, functional pictures which kindergarten children can discuss in groups. A consumable paperback, _Let's Talk and Write_, presents pictures for first grade class discussion and statements students can write for practice. _Language for Daily Use_ textbooks for grades two through eight include instructional lessons with illustrations, literature selections, discovery models, practice exercises, and book reviews. Chapter and unit tests are also included. Workbooks are available for grades two through eight. A _Teacher's Edition_ for each grade, two through six, and an answer book, for grades seven and eight, may also be ordered.

Teacher's Guide: The _Teacher's Edition_ for each textbook of

Language for Daily Use, grades two through six, provides several teacher aids. Yearly and lesson objectives are stated. Suggestions for teaching include motivation ideas, individualization procedures and evaluation techniques. Chapter, mid-year and end-of-year tests are included. A flexible lesson plan for each lesson incorporates background material, review practice, procedures to follow, and enrichment activities.

Subject Matter and Teaching Strategy:

Language for Daily Use provides basic language arts material for elementary school children. The books and workbooks may be used with whole-class participation if all students are on the same level. However, induction discussions may be held with small groups and the teacher may use individualization procedures, enrichment activities and workbooks to provide for the students individually. Since the books are designed on the basis of principles of child development, students would probably use them to their best advantage when they were developmentally ready for each book. Thus, though the books are graded, they may lend themselves to use according to readiness.

Rationale:

Language for Daily Use views the child as a knowledgable user of the English language who naturally experiments with language expression. The series aims to develop skill in oral and written expression while maintaining the natural joy and enthusiasm children have for language. The induction method of teaching leads students to make discoveries for themselves so that the generalizations they arrive at are more meaningful. The method is more enjoyable to students than traditional rule-teaching has been.

Research or Evaluative Evidence:

Background reading

Association for Childhood Education International. *Creative dramatics*. Washington, D.C.: The Association, 1961.

Mearns, Hughes. *Creative power: The education of youth in the creative arts* (Second Revised Edition). New York: Dover, 1959.

What: *Learning Language Skills: A Creative Approach Level I*

Louise Binder Scott

Published By:
Webster/McGraw-Hill
30th Floor
1221 Avenue of the Americas
New York, New York 10020

How To Order:
Order from publisher.
List price: $67.50
Consumable items: None.

Description: *Learning Language Skills* is a set of readiness materials which stimulate language development through the use of a combination of sensory multi-media experiences. The authors suggest that if the program is carefully planned to meet the children's needs and if it is presented with enthusiasm, the program will:

Awaken a combination of sensory avenues to acquiring concepts

Sharpen powers of observation

Stimulate creative thinking

Strengthen the children's faith in themselves

Facilitate logic and thinking

Enrich vocabulary and improve grammatical usage.

Target Audience: The program meets individual as well as group needs and is appropriate for pre-school through third grade, and for primary special education. Level I is appropriate for children ages 4-6.

Materials Provided:

One Honey Bear (a hand puppet which motivates children to listen, participate, dramatize, and use language).

Language Evaluations (diagnostic aids to assess sound discrimination, articulation of final "s" in plurals, consonant articulation, and language behavior of the child at the beginning of the program).

One Look-Listen-Say Mirror Book (12 x 15 book with different consonant speech sounds) with a mirror to let the children see their mouth positions as they name pictures.

120 Small Picture Cards from Look-Listen-Say book.

20 Look-Listen-Say Story Cards (12 x 15).

One Who Are We? (28-page animal book).

One Teeny Mouse and Tiny Mouse (28-page book).

One Teacher's Guide.

Teacher's Guide:

The teacher's guide describes the parts of the kit and gives an overview of language experiences. Samples of daily plans are given, information and supplemental procedures for language evaluations are suggested, and behavioral objectives and procedures are provided.

Learning Language Skills (Level I) is designed to meet individual as well as group needs by helping a teacher select the program that best suits the needs of the children.

Subject Matter and Teaching Strategy:

Learning Language Skills (Level I): A Creative Approach constitutes a complete language readiness development program appropriate for preschool through third grade, and for primary special education classes.

This program emphasizes guiding the children through skillful questioning to discuss relationships for themselves rather than on insisting upon an immediate, correct answer. Opportunities for storytelling, role-playing, and sensory experiences are also provided.

Rationale:

Language is a continuous process which occurs in the classroom throughout the day. Language skills are acquired through play and discovery as well as through purposeful, structured learning sessions. _Language Learning Skills_ (_Level I_) provides opportunities for both practice of language skills and for independent creative expression.

Research or Evaluative Evidence:

Learning Language Skills was tested on primary school children in the Ontario-Montclair School District, San Bernadino County, California. The results were essentially positive. If the program is carefully planned to meet children's needs and is presented with enthusiasm, it will facilitate their progress in the formal skills of reading and writing.

For Further Reading:

General discussion

Scott, L. _Learning time with language experiences for young children_. New York: McGraw-Hill Book Company, 1968.

Scott, L. My first writing book (Teacher's Edition). New York: McGraw-Hill Book Company, 1968.

Scott, L. Tell-again story cards, Level I. New York: McGraw-Hill Book Company, 1967.

Scott, L. Stories for listening, Set I. New York: McGraw-Hill Book Company, 1970.

What: Let's Begin

Doris Edmund

Published By:

Creative Teaching Press
514 Hermosa Vista Avenue
Monterey Park, California 91754

How To Order:

Order from publisher.
List price: $5.95.
Consumable items: None.

Description:

Let's Begin is a collection of over 100 creative ideas of interesting, stimulating and enjoyable activities that stimulate the expression and imagination of young children. The ideas are indexed into areas of art, mathematics, language and literature, movement education, science, and social relationships. The activities range from finger painting to story-telling to blockbuilding, and involve classroom work, dancing, nature, trips, and interpersonal situations.

Each idea is described on a card that outlines materials, procedures, and suggestions. In some cases, related books for the teacher and child are listed.

Target Audience: Preprimary.

Materials Provided:

Over 100 4" x 5" index cards of ideas, indexed and collected in a file box.

Teacher's Guide.

Teacher's Guide:

Each category of ideas is introduced with an explanation of the objectives of the activities, and hints to the teacher on how to promote the expressive creativity and learning of the children through the use of the ideas.

Subject Matter and Teaching Strategy:

A wide variety of activities is offered, including games, songs, and dances. The general course of activity in the preprimary classroom is not generally based on written material, and the Let's Begin activities are correspondingly geared towards non-written performance. The ideas are oriented towards varying levels of ability, and the teacher may discover that it is best to involve separate groups in different activities geared to members' readiness. Some activities may occupy the whole class, such as dramatic presentations and singing.

The Let's Begin series can serve as an enriching extension of a regular daily program, or an entire program may be built around the expressive activities that it contains.

Rationale:

The rationale underlying Let's Begin is that the expressive involvement of young children in their learning is very important. By encouraging children to explore, observe, question, and express themselves, learning becomes fruitful and rewarding for both teacher and pupil. The author demonstrates the conviction that an interested, enthusiastic, and warm teacher who is supportive of the individuality of the student, can facilitate the full growth of each individual.

What: Madison Project Materials

R. B. Davis

Published By:
Addison Wesley Publishing Company
2725 Sand Hill Road
Menlo Park, California 94025

How To Order:
Order from publisher.
List price: Refer to "Materials Provided" section for price listing.
Consumable items: None.

Description:

Madison Project Materials was developed at Syracuse University and Webster College and was designed to guide teachers in teaching mathematics by the discovery method. The materials serve as a supplement to the regular arithmetic curriculum. They present higher mathematics topics, techniques, methods, and materials.

Target Audience:

Some of the materials are appropriate for use with second graders. All of them can be used in grades five through nine.

Materials Provided:

Discovery in Mathematics: Student Discussion Guide; price $2.82.
Discovery in Mathematics: A Text for Teachers; price $7.65.
Exploration in Mathematics: Student Discussion Guide; price $2.82.
Exploration in Mathematics: A Text for Teachers; price $7.65.

Student guides are written to aid the student in learning mathematics through discovery by providing him/her with questions to be used with and following each teacher discussion.

Teacher's Guide:

The teacher's text provides background material in mathematics and teaching suggestions. A detailed guide to the discovery method lists questions in the order the teacher might use them, answers to the questions, and directions for aiding students in particular activities. Introductory materials suggest procedures for teachers to follow in order to free students from anxiety and maximize their creativity.

Subject Matter and Teaching Strategy:

Madison Project Materials is designed to be used as supplements to the regular arithmetic curriculum and to provide creative learning experiences with concepts of algebra, geometry, and coordinate geometry. The textbook for teachers and the guide for students present a discovery approach to mathematics. Total teacher participation is required in discovery sessions. The author suggests that the sessions should be held two or three times a week for a total of an hour a week. The whole class should participate in discussions and follow the questions and answers in their individual guides. The program can be used only with better students in each class; however, the author feels that all children can benefit.

Rationale:

Madison Project Materials presents mathematics in a form by which children who are not usually taught mathematics can learn the concepts and techniques. The decision to teach mathematics to fourth, fifth, and sixth graders is based on three factors. First, when material is presented in a nonauthoritarian way, children can deal with the concepts more creatively and with more originality than older children do. Second, if these children learn to enjoy mathematics, they should approach later mathematics experiences creatively and confidently. Third, an early-introduced program in mathematics should build a foundation upon which junior high and high school mathematics can be firmly based.

What: *Man: A Course of Study*

Educational Development Center, Inc.

Published By:
Curriculum Development Associates, Inc.
Suite 114
1211 Connecticut Avenue
Washington, D. C. 20036

How to Order:
Order from publisher.
List price: Prices vary. Consult catalog. A representative sample set may be purchased for $5.00. Research and evaluation report available for $1.50.
For: A complete kit containing films, booklets, maps, filmstrips, teacher's guides and games.

Description:

Man: A Course of Study is a flexible program emphasizing social science skills such as methods of observation, data collecting, problem finding, hypothesizing, and problem solving. The program centers around these questions: "What is human about human beings?", "How did they get that way?", and "How can they be made more so?" Information concerning animal behavior, parenthood, life cycles, natural selection, and adaptation is presented in four units. Major topics are the life cycle of the salmon, behavior patterns of herring, gulls, free-ranging baboons, and the culture of the Netsilik Eskimoes. These topics can be covered in a full year's work.

Content is presented through films and field notes describing the behavior of the animals and the Eskimoes. Children are lead to discover concepts through the inquiry method and simulation games. Opportunities are provided for creative drama, art, and writing.

Target Audience: Planned to be an ungraded program, *Man: A Course of Study* is most applicable from fourth grade through junior high school.

Materials Provided: Films--16 films in color with natural sound and a minimum of commentary provide a simulation of field observations.

Booklets--30 booklets have differing puposes. Some supply data to accompany films; others present concepts; several are simulated field notes and journals; others are anthologies of poetry, songs, and stories.

Other materials provided are three educational games, four records, five filmstrips and 23 maps, posters and photomurals.

Teacher's Guide: Consultation services are offered by the publisher for pre-service and in-service training of teachers. 20 seminars have been designed for use by teachers who can meet regularly while they are teaching the course. These seminars follow the pre-service and in-service training provided. Nine books for teachers accompany the program. They contain background information, bibliographies, suggested lesson plans, evaluation strategies, and material to be used in in-service seminars.

Subject Matter and Teaching Strategy: *Man: A Course of Study* is a comprehensive social studies curriculum which provides a year's work. The emphasis is on the study of man through contrasts of modern urban cultures with animal and primitive human cultures. Organizing ideas recur through the study of each unit so that concepts grow and change as students increase their understanding. Data on animal behavior is presented through films and booklets. The students are lead to build concepts of animal-human behavior by contrasts and comparisons, through collecting data, posing problems and solving problems. Simulation games provide further insight-forming opportunities.

This program also provides language arts instruction since poetry, stories and songs are presented as part of the study of man. Children are given opportunities for creative writing, art, and drama.

The materials provided are designed to be used both in small groups where film-viewing, note-taking, game-playing, drawing and experimentation are facilitated, and in large groups, where discussion of specifics can lead to class definition of a concept.

Rationale: Man: A Course of Study is designed as a study of man, his nature and the forces, such as adaptation and natural selection, that shaped him. Questions of the nature of man are introduced by providing animal contrasts. The program aims to help students feel confidence in their mind-power, to give students respect for the need for thought concerning the human condition, to give students access to models for analyzing social behaviors of man and the setting for these behaviors, to give students help in understanding the capacities of man compared to animals, and to give students a basis for concern for humanity of all races and cultures.

Research or Evaluative Evidence:

The developers of Man: A Course of Study report research they have completed. In sixteen school systems, urban and suburban, 123 classrooms including 3003 students, were tested. The group consisted of fourth, fifth, and sixth grade boys and girls with a few children from ungraded classrooms. Students were tested with multiple choice and open-ended items on information, concepts and attitudes before the program began and later when it was finished. Classroom observation, student and teacher interviews and teacher evaluations were also used as data. Results showed that the children acquired and retained a significant amount of information. They showed an increased ability to reason after completing the program. No sex differences appeared on test results. No sex differences were observed in classroom behavior. Differences in achievement were not related to intelligence or knowledge shown on the pretest.

For Further Reading:

General discussion

Beals, A. R. Culture in process. New York: Holt, Rinehart and Winston, 1967.

Bruner, J. S. On knowing: Essays for the left hand. New York: Atheneum, 1967.

Honigmann, J. J. Understanding cultures. New York: Harper and Row, 1963.

What: *Maths Mini-Lab*

Published By:
Selective Educational Equipment, Inc.
Three Bridge Street
Newton, Massachusetts 02195

How To Order:
Order from publisher.
List price: $44.50.
Consumable items: Prices for specific materials are available from publisher.

Description:

This kit is a creative and enjoyable way to learn and teach mathematical principles. It is a collection of instructional materials, activities, and ideas for both students and teachers. The materials help teachers start their students on solving problems related to mathematics.

Target Audience: All elementary grade levels.

Materials Provided:

The materials provided include: colored cubes, wooden sticks, a pair of dice, a ball, string, straws, pipe cleaners, food coloring, clay, sheets of plastic pieces, mirrors, Cuisenaire rods, a map measurer, a circular protractor, a wooden ruler, and several varieties of printed material. All materials are packed into a plastic storage box.

145 Starter Activity Cards.

Teacher's Guide.

Teacher's Guide:

The *Teacher's Guide* explains the purposes of the Maths Mini-Lab, the materials included in the kit, concepts which can be learned from the materials, and specific activities provided by the kit.

Subject Matter and Teaching Strategy:

The teacher can present each mathematical concept to the total class, children can try each activity independently, or groups of children can work on the activities. Children in grades 4-6 should have little difficulty reading the Activity Starter Cards, although it may be necessary for the teacher to read the activities aloud to younger children.

Rationale:

The Maths Mini-Lab provides students with materials they can use to solve problems relevant to their environment and mathematics. Children physically manipulate the materials, and abstract concepts take concrete form. The activities emphasize the presence of mathematical principles in everyday situations.

What: New Directions in Creativity
Mark I, II, III

Joseph S. Renzulli, Carolyn M. Callahan

Published By:
Harper and Row, Publishers, Inc.
School Department
2500 Crawford Avenue
Evanston, Illinois 60201

How To Order:
Order from publisher.
List price: $16.00. School price: $12.00.
Consumable items: Each book contains 48 duplicating masters of activities.

Description: New Directions in Creativity is designed to develop the creative thinking skills of children through exercises in divergent thinking. The programs concentrate on improving fluency, flexibility, originality, and elaboration in the context of language arts through making up stories and sentences and working with words in a variety of ways.

Target Audience: No rigid grade levels are prescribed, but grades 4 to 8 are the most highly recommended.

Mark 1	Gr. 4-5
Mark 2	Gr. 5-6
Mark 3	Gr. 6-7

Materials Provided: Each level (Mark 1, 2, 3) consists of a book containing a teacher's guide and 48 duplicating masters.

Teacher's Guide: The Teacher's Guide presents a description of the history, purpose, and goals of the program. Also included is a summary of some of the theory and research that led to the formulation of the

New Directions in Creativity series. Suggestions for the teacher on how to best use the program's activities and enhance its effects are included.

Subject Matter and Teaching Strategy:

Each activity requires a class period to complete, so the program could be used with whole classroom groups in language arts activities. The follow-up suggestions for each activity can be used to extend the material and ideas into other classroom subjects. The program could also be used effectively in an individualized or open classroom.

Rationale:

New Directions in Creativity has been produced in answer to a recognized need for effective, research-based curricular materials for developing children's creativity. The program is based on evidence that all children have potential for creative thought and that the exercise of their creative abilities will result in cognitive growth.

What: New Directions in English

Developed by Freeman Anderson, David Armington,
John Deniis, Richard Sanders, William Dusel,
George Rosato, and Elizabeth McKinnon.

Published By:

Harper and Row, Publishers, Inc.
School Department
2500 Crawford Avenue
Evanston, Illinois 60201

How To Order:

Order from publisher.
List price: Pupil text and teacher's edition individually range in cost from $1.23 to $3.75 each.
Consumable items: None.

Description:

New Directions in English is an exciting language arts program for grades 1-8 which builds upon and encourages the development of the child's natural drive to discover and create. New Directions in English continues the child's basic learning process through planned language activities. It is designed to accommodate the individual learning styles of students and to make the study of English meaningful to them.

Each book of the series expands and develops what the student already knows. Perceiving, as a thinking skill, is stressed in the opening chapters of each book. The students are asked to consider how they perceive their relationships to the world and how they use language to express those relationships. The creative ability of each child is expressed and developed through various exploratory activities and inventions. Students are given practice in generating incongruities, as well as in generating questions to guide inquiry. They are given ample opportunity to learn how to verify ideas, conclusions, hunches, and facts.

The *New Directions in English* program also aids students in becoming aware of language as it actually operates, in a variety of usages and in a variety of dialects. Students' analytical abilities and their awareness are sharpened by learning to make distinctions and by perceiving how things are alike and how they are different.

The emphasis of this program is on learning rather than on teaching. The students are helped to think for themselves. *New Directions in English* frequently introduces open-ended problems. The students are invited to use their minds, not merely to "fill in the blanks" or "select the best answer," but to perceive connections and often to generate them.

Much of the learning activity involving *grammar* is left to the students. They are asked to examine their language and to manipulate it under controlled conditions in order to see how they can make it behave. The dignity of a child's own dialect is respected and at the same time he/she is shown the advantage of learning an additional dialect. Motivation is seen as the key to an effective *com-*

position program and is strengthened throughout *New Directions in English* by giving the student some choice in, and responsibility for, his/her own composition goals.

Target Audience:

Elementary grade levels, 1-8.

Materials Provided:

One *Student text* which is divided into two main sections: Language and Composition.

The language section contains thirteen chapters on various language concepts, each of which presents, develops, and reinforces the respective concepts. Review sections, dictionary entries, and a language handbook which contains information on sentence mechanics, outlines, letters, grammar, and usage are attached to the text.

The composition section is composed of fourteen units, each of which poses questions that provoke discussion of the selection and of the students' ideas about the unit theme, presents in detail the composition skill covered in that unit, and offers warm-up exercises and assignment suggestions. A checklist is also provided for the student to use in proofreading his papers.

One *Teacher's guide*.

Teacher's Guide:

The teacher's edition offers an explanation of the background and philosophy of the *New Directions in English* series. Overviews and evaluation exercises for the language chapters and information on using the composition materials, evaluating the students' work, and achieving the goals of composition are given. A glossary and index of linguistic terms, a bibliography of books and articles which may be helpful in teaching the series, suggested procedures for teaching the material, as well as additional exercises and extensions of the student text, are provided.

Subject Matter and Teaching Strategy:

New Directions in English is an integrated total linguistic program in language and composition for elementary education.

Students are given opportunities to explore various methods of inventing, given practice in generating incongruities and questions to guide inquiry. Open-ended problems are often used. In all cases, different learning styles and teaching techniques are encouraged in this program.

Rationale:

New Directions in English is based upon the idea that children already have great skills in language when they enter school. The authors contend that a curriculum should take advantage of what the student knows before he/she comes to the classroom. This knowledge should form the core of that curriculum--expanded and developed at all grade levels.

Language is studied in this program as human behavior rather than as a system of structure and prescriptions. Standards for evaluating and judging levels of language use can be developed by presenting students with situations from which they can gain insights into the nature of people and cultures, and thus into the nature of language.

The authors of this language series believe that an individual's competence always exceeds his/her performance. A teaching approach which stresses inquiry and the discovery or invention of patterns is the best suited method to reveal the student's deeper levels of competence. All learning has its foundations and vital beginnings in the student's own experience. It is augmented, deepened, and clarified within the school setting by discussion, literature, poetry, art, music, and free creative writing.

Research or Evaluative Evidence:

The development group of *New Directions in English* is particularly well qualified. Collectively they offer the teacher the advantages of strong language teaching backgrounds at both the college and elementary levels, as well as an extensive background in the professional development of educational materials. This series was developed in association with the highly reputable Educational Development Corporation at Palo Alto, California.

For Further Reading:

General discussion

Moffett, James. *A student-centered language arts curriculum, grades K-13: A handbook for teachers*. Boston: Houghton Mifflin Company, 1968.

Frazier, Alexander, Ed. *New directions in elementary English*. Champaign, Illinois: National Council of Teachers of English, 1967.

Fries, C. C. *The structure of English: An introduction to the construction of English sentences.* New York: Harcourt, Brace and Company, 1952.

Steinberg, Erwin R. et al. The inductive teaching of English. *English Journal*, 1966, *55* (2), 139-157.

Kohl, Herbert. *Teaching the "unteachable."* New York: The New York Review, 1967.

What: *Peabody Language Development Kits*

developed by Lloyd M. Dunn and James O. Smith

Published By:
American Guidance Service, Inc.
Publishers' Building
Circle Pines, Minnesota 55014

How To Order:
Order from publisher.
List price: Complete Kits of Level #P (Mental ages 3-5) @ $145.00
Complete Kits of Level #1 (Mental ages 4½-6½) @ $52.00
Complete Kits of Level #2 (Mental ages 6-8) @ $65.00
Complete Kits of Level #3 (Mental ages 7½-9½) @ $50.00
Consumable items: None.

Description:

The *Peabody Language Development Kits* are self-contained kits of lessons and materials designed to stimulate overall oral language and creative thinking ability. Each of the four kits consists of 180 carefully-designed and pre-tested lessons that have been proven effective in stimulating oral language development and intellectual processes of slower and disadvantaged children of the primary grades.

The *Peabody Language Development Kits* lessons are intended to be a supplement to a school's language arts program. The activities do not require reading or writing skills and no seatwork is involved. All children participate together at one time during the lesson activity. The emphasis of each lesson is on thinking, talking, and understanding speech through highly motivating activities.

Each of the four kits is carefully sequenced in terms of difficulty. Brain-storming, problem solving, and similar activities are programmed in each kit to stimulate divergent thinking. Creativity is encouraged throughout the activities. Receptivity is stimulated by "see, hear, and feel" activities. Expression is provided through the "say and do" activities. All the lessons and activities concentrate on the development of cognitive processes involving divergent, convergent, and associative thinking.

Level 2 of the _Peabody Language Development Kits_, for example, is specifically designed for children whose language ages are in the range of six to eight years. It is especially effective with second grade children who come from economically disadvantaged homes and with first grade children who are intellectually average. It is also appropriate for intermediate trainable retarded children. This level places an increased emphasis on stimulation of cognitive activities.

Target Audience: Primary grade level, economically disadvantaged, and educable mentally retarded children.

Materials Provided: Levels 1, 2, and 3 contain each of the following:

Full-color, 7" x 9" stimulus cards provide visual stimulation for many activities. They are especially effective in vocabulary building and in stimulating associative thinking. Level 2, for example, contains 424 stimulus cards arranged in 7 different categories: animal cards, clothing cards, family cards, numbers-in-color cards, occupation cards, shapes-in-color cards, and tool cards.

A set of large "Story" and "I Wonder" full color posters lithographed on heavy plastic paper provide children with stimulating pictures for imagination and continuity in story telling. Level 2 contains 12 "I Wonder" cards presenting pictures which range from the landing of outer spacemen to a bus scene.

A 5" magnetic tape recording contains stories and folk tales, songs and music for introducing and concluding "language time." The recording tape for Level 2 contains two introductory and two concluding songs and eight folk tales--The Boy and the North Wind, Little One Inch, The Ugly Duckling, Mr. Lucky Straw, The Legend of Inchcape Rock, The Story of William Tell, Winter Comes to Babette, and Friends are Like That: Yes They Are.

Level 3 contains four 7" records which provide a number of different sounds and sequence of sounds to stimulate divergent interpretation of auditory stimuli.

Hundreds of plastic color chips are included with each kit. They can be used to teach the colors, groups and shades of colors, color sequencing, and for training memory skills. The chips are interlocking to allow chaining. A major use of the chips is as tokens to reinforce satisfactory performance of the children.

Two hand puppets are included in each kit to focus attention on certain of the activities.

The "teletalk" is an innovation in Level 2. It is a two-way inter-communication device which permits exercises where the children communicate through language alone. The teletalk provides many opportunities for games and imagination.

Teacher's Guide: The daily lesson manual contains all the lessons of oral language and intellectual stimulation that have been developed for that specific kit level. Each lesson gives explicit directions for presenting the various activities. The manual contains general guidelines to follow in presenting the lessons and using the materials. Research and evaluative evidence are also contained in the manual.

Subject Matter and Teaching Strategy:

The Peabody Language Development Kits are designed to teach oral language skills. Twenty-four different types of activities are used which do not require reading or writing skills. No seat work is involved. The speech activities range from memory games and guessing games to reasoning games and rhyming games.

Most daily lessons contain an activity that allows free movement on the part of the class. All children participate at the same time. The Emphasis is on thinking, talking, and understanding speech. Receptivity, conceptualization and expression are the main linguistic processes stressed. The kits are intended to be a part of a school's total language arts program. They are not intended to replace the regular curriculum.

Creative thinking and imagination are encouraged in activities in which children create

Each of the four kits is carefully sequenced in terms of difficulty. Brain-storming, problem solving, and similar activities are programmed in each kit to stimulate divergent thinking. Creativity is encouraged throughout the activities. Receptivity is stimulated by "see, hear, and feel" activities. Expression is provided through the "say and do" activities. All the lessons and activities concentrate on the development of cognitive processes involving divergent, convergent, and associative thinking.

Level 2 of the Peabody Language Development Kits, for example, is specifically designed for children whose language ages are in the range of six to eight years. It is especially effective with second grade children who come from economically disadvantaged homes and with first grade children who are intellectually average. It is also appropriate for intermediate trainable retarded children. This level places an increased emphasis on stimulation of cognitive activities.

Target Audience: Primary grade level, economically disadvantaged, and educable mentally retarded children.

Materials Provided: Levels 1, 2, and 3 contain each of the following:

Full-color, 7" x 9" stimulus cards provide visual stimulation for many activities. They are especially effective in vocabulary building and in stimulating associative thinking. Level 2, for example, contains 124 stimulus cards arranged in 7 different categories: animal cards, clothing cards, family cards, numbers-in-color cards, occupation cards, shapes-in-color cards, and tool cards.

A set of large "Story" and "I Wonder" full color posters lithographed on heavy plastic paper provide children with stimulating pictures for imagination and continuity in story telling. Level 2 contains 12 "I Wonder" cards presenting pictures which range from the landing of outer spacemen to a bus scene.

A 5" magnetic tape recording contains stories and folk tales, songs and music for introducing and concluding "language time." The recording tape for Level 2 contains two introductory and two concluding songs and eight folk tales--The Boy and the North Wind, Little One Inch, The Ugly Duckling, Mr. Lucky Straw, The Legend of Inchcape Rock, The Story of William Tell, Winter Comes to Babette, and Friends are Like That: Yes They Are.

Level 3 contains four 7" records which provide a number of different sounds and sequence of sounds to stimulate divergent interpretation of auditory stimuli.

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Two hand puppets are included in each kit to focus attention on certain of the activities.

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Most daily lessons contain an activity that allows free movement on the part of the class. All children participate at the same time. The emphasis is on thinking, talking, and understanding speech. Receptivity, conceptualization and expression are the main linguistic processes stressed. The kits are intended to be a part of a school's total language arts program. They are not intended to replace the regular curriculum.

Creative thinking and imagination are encouraged in activities in which children create stories, think up unusual uses for objects, and carry on spontaneous conversations.

Rationale:

The Peabody Language Development Kits were designed to stimulate oral language development. By means of auditory, visual and tactual presentation of materials, cognitive processes involving divergent, convergent, and associative thinking are also developed. This development is expressed through various "say and do" activities.

Secondary purposes of the Kits were to develop the verbal intelligence of disadvantaged and retarded children, and thus to enhance their school achievement.

Research or Evaluative Evidence:

A large number of studies have proven the effectiveness of the Peabody Language Development program in raising verbal intelligence and school achievement of economically disadvantaged primary school children. Other studies indicate the superiority of such planned, long-term programs over short-term intensive language programs.

A list of references and selected abstracts regarding all levels of the Peabody Language Development Kits is available from the publisher.

For Further Reading:

Theoretical Discussion

Dunn, L. M., Pochanart, P., and Pfost, P. The effectiveness of the Peabody Language Development Kits and the Initial Teaching Alphabet with disadvantaged children in the primary grades: after two years. IMRIK Monograph #6. Nashville, Tenn.: Peabody College, 1967.

What:	The Productive Thinking Program Martin V. Covington, Richard S. Crutchfield, Lillian Davies, Robert M. Olton
Published By:	Charles E. Merrill Publishing Company A division of Bell and Howell Company 1300 Alum Creek Drive Columbus, Ohio 43216
How To Order:	Order from publisher. List price: $120.00. Consumable items: Reply booklets; problem sets workbooks.
Description:	The Productive Thinking Program is a suspense-filled learning experience that teaches high-level thinking skills. Students become imaginative detectives and improve their thinking skills by solving mystery cases. Students' participation in the program will result in improvement of the following skills: Recognizing puzzling facts Asking relevant, information-seeking questions Solving problems in new ways Generating ideas of high quality Evaluating ideas Achieving solutions to problems
Target Audience:	Grades 5 and 6.
Materials Provided:	A 35" x 47" chart of Thinking Guides for classroom display. Fifteen Basic Lesson Booklets in cartoon form. Reply Booklets. They are used with the basic lessons, providing systematic feedback on student responses.

Problem Sets. These are supplementary materials for further extension and strengthening of skills taught in basic lessons.

Teacher's Guide.

Teacher's Guide:

Explains the program, provides administration procedures, discussion of lessons and problem sets, and follow up activities for the teacher.

Subject Matter and Teaching Strategy:

The Productive Thinking Program is an individualized study program for students, with opportunities for group discussion and application of skills learned.

The program fits well into the language arts curriculum with emphasis on reading, writing, analyzing facts, organizing thoughts, and thinking critically. The program can also be integrated into a social studies area. It provides skills in generating ideas, looking at things in new ways, imagining different possibilities, and thinking creatively.

The format of the program adapts well for effective use in learning centers. The exercises also serve as springboards for discussion. Small groups could work as teams and become cooperative case-breakers.

Rationale:

The Productive Thinking Program teaches

children how to think, not what to think. Direct training of thinking skills to develop students' full potential for solution of problems of any nature can be developed. These are generalized skills, underlying all sorts of problem solving. These productive thinking skills are developed using the context of meaningful problems that motivate the student to use his mind in an independent way.

Research or Evaluative Evidence:

Research shows that different methods of presentation are effective depending on the length of time spent in administering the program. Self-instructional methods (i.e. learning centers, individualized study) are most effective when the program is presented over a short period of time. When the instructional period is pread out over a fairly long period of time, discussion and teacher involvement with the Productive Thinking Program provide better results.

In general, the program seems to be more effective when the teacher initiates discussion and promotes generalization of skills developed by the program into other situations.

The program has been shown to be effective in developing verbal fluency and positive attitudes toward problem solving among students. Reading comprehension can be increased by helping the student to make more innovative and productive use of what he reads.

The program is equally effective for boys and girls. There is some possibility that the program loses its effectiveness for older children. For example, the program may not be effective for students beyond grade five or six.

For Further Reading:

Research on the Productive Thinking Program

Davis, Gary A. *Psychology of Problem Solving: Theory and Practice*. New York: Basic books, 1973.

Lindsey, J. F. and Hicks, D. "A Note on Teaching for Creativity" *California Journal of Educational Research*. 11 (2), 84-87. March, 1970.

Treffinger, Donald J., Speedie, Stuart M., and Brunner, Wayne D. "Improving Childrens' Creative Problem Solving Ability: The Purdue Creativity Project" *The Journal of Creative Behavior*. 1974, 8 (1), 20-29.

What: *The Purdue Creative Thinking Program*

John F. Feldhusen, Susan J. Bahlke, and
Donald J. Treffinger

Published By:

Purdue University
Audio-Visual Department
West Lafayette, Indiana 47907

How To Order:

John F. Feldhusen, Purdue University
List price: $75.00.
For: Twenty-eight tapes and one set of 3-4 exercises per tape.
Consumable items: Exercise worksheets.

Description:

The Purdue Creative Thinking Program consists of 28 audio-tapes and a set of three or four printed exercises for each tape. The taped program consists of two parts: a three to four minute presentation designed to teach a principle or idea for improving creative thinking, and an eight to ten minute story about a famous American pioneer. The exercises for each program consist of printed directions, problems, or questions which are designed to provide practice in originality, flexibility, fluency, and elaboration in thinking.

Target Audience: Grade levels 4, 5, and 6.

Materials Provided: Cassette tapes. Twenty-eight audio-tapes, each 15 minutes long, giving specific suggestions for creative thinking and an historical story narrated by a professional radio announcer and dramatized with sound effects and background music. The program closes with an introduction to the first creativity exercise.

Exercise worksheets. A series of three or four creativity exercises accompanies each tape. The exercises are to be duplicated on 8" x 11" paper and distributed to students. One set of exercises for each tape is provided with the initial order.

Teacher's Guide:

A teacher's manual accompanies the program. It gives a brief description and rationale of the program. Written transcripts of the audio tapes are presented along with a statement of the required exercises. General guidelines for the teacher are also provided for help in using the series, along with a set of specific directions for proper administration of the program.

Subject Matter and Teaching Strategy:

The content of the audio-tapes focuses on social studies. The series also teaches skills (writing and listening) which would be relevant to the language arts.

The program is designed to be administered in a group setting. It could be easily adapted to an individualized learning center activity.

Rationale:

The program is designed to develop the student's divergent thinking skills. Specifically, the exercises provide training in fluent, flexible, original and elaborative thinking. These thinking skills increase a child's creative thinking and problem solving ability.

Research or Evaluative Evidence:

The Purdue Creative Thinking Program has been found to be very successful in increasing and providing overall improvement of the divergent thinking skills of fourth, fifth, and sixth grade children. The program is most effective for fourth graders, moderately effective for fifth graders, and least effective for sixth graders. The program is equally effective for both boys and girls. It has also been used successfully in two other cultures and in inner city schools with children from low income areas and with ethnic minorities.

There are three components to the Purdue program: (1) presentation of ideas for improving creative thinking, (2) stories, (3) and exercises. Overall, the program has been shown to increase and improve divergent thinking skills. Each component has also been proven to be effective for improving creative skills. There is some evidence that indicates the program also improves language skills, as measured by the Iowa Test of Basic Skills.

The Purdue Creative Thinking Program can be administered individually with good results. However, the best results have been obtained by using one or two programs a week with the whole class over an extended period of time.

For Further Reading:

Theoretical Discussion

Davis, G. A. *Psychology of problem solving theory and practice*. New York: Basic Books, Inc., 1973.

Feldhusen, J. F., Bahlke, S. J., and Treffinger, D. J. Teaching creative thinking. *The Elementary School Journal*, 1969, *70* (1) 49-53.

Feldhusen, J. F., Treffinger, D. J., and Bahlke, S. J. Developing creative thinking: The Purdue Creative Thinking Program. *The Journal of Creative Behavior*, 1970, *4* (2) 85-90.

Feldhusen, J. F., Speedie, S. M., Treffinger, D. J. The Purdue Creative Thinking Program: Research and evaluation. *NSPI Journal*, 1971, *10*, 5-9.

Speedie, S. M., Treffinger, D. J., and Feldhusen, J. F. Evaluation of components of the Purdue Creative Thinking Program: A longitudinal study. *Psychological Reports*, 1971, *29*, 395-398.

Shively, J. E., Feldhusen, J. F., and Treffinger, D. J. Developing creativity and related attitudes. *The Journal of Experimental Education*, Winter 1972, *41* (2), 63-69.

Thomas, S. J., and Feldhuse, J. F. To spark an interest: Think creatively. *The Gifted Child Quarterly*, Spring 1971, 36-41.

Treffinger, D. J., Speedie, S. M., Brunner, W. D. Improving children's creative problem solving ability: The Purdue Creativity Project. *The Journal of Creative Behavior*, 1974, *8* (1) 20-29.

Treffinger, D. J. and Ripple, R. E. Programmed instruction in creative problem solving. *Educational Leadership*, 1971, *28* (5) 667-675.

What: Reading Caravan, Revised

Paul A. Witty, Mildred Hoyt Bebell,
Alma Moore Freeland

Published By:
D. C. Heath and Company
125 Spring Street
Lexington, Massachusetts 02173

How To Order:
Order from: D. C. Heath and Company
Distribution Center
2700 North Richardt Avenue
Indianapolis, Indiana 46219
List price: Refer to "Materials Provided" for price listing.
Consumable items: None.

Description:

Reading Caravan is a supplementary reading series of anthologies. They are designed to extend reading skills, provide reading in content fields, fulfill developmental needs, and facilitate concept building and vocabulary development. The textbooks lend themselves easily to individualized instruction in listening skills and critical reading. Suggested activities encourage creative dramatics, art, and writing as responses to plays, poems, and stories presented in the anthologies. Experimental and exploratory activity ideas follow some reading selections. Primary textbooks present many stories on occupation topics. Textbooks for the middle grades contain stories dealing with exploring, discovery, science, nature, animals, space travel, and construction. All selections aim to teach a concept which should increase students' self-understanding and appreciation of others.

Target Audience: Grade levels 1-6.

Materials Provided: Reading Caravan consists of a reader for each grade level, first through sixth, and a primer for grade one. Each reader is an anthology containing stories, poems and a play. The anthologies contain selections by well-known children's authors such as A. A. Milne and Laura Ingalls Wilder. A Teacher's Edition and a record are available for each reader. The list price is given for the following items:

Peppermint Fence, Primer	$3.92
Teacher's Edition	$4.68
Sky Blue, First Reader	$4.24
Teacher's Edition	$5.08
Star Bright, Second Reader	$4.40
Teacher's Edition	$5.28
Meadow Green, Third Reader	$4.64
Teacher's Edition	$5.56
Peacock Lane, Fourth Reader	$4.64
Teacher's Edition	$5.56
Silver Web, Fifth Reader	$4.88
Teacher's Edition	$5.84
Treasure Gold, Sixth Reader	$4.88
Teacher's Edition	$5.84
Records for each title	$6.60

Teacher's Guide: Reading Caravans Teacher's Editions provide flexible guides for teaching the textbooks as supplementary readers by small group or individualized instruction. Plans for each lesson provide guides for introducing materials, motivating students, and helping them set goals and realize lesson purposes. Other teacher aids list enriching and extending suggestions, including ideas encouraging creativity. The teacher is guided in structuring activities for student self-direction and self-evaluation. Concepts covered, content and divergent questions, independent exercises and resource materials are listed for teachers.

Subject Matter and Teaching Strategy:

Reading Caravans is a reading and language arts supplement which extends skills covered in reading and language arts and provides activities for applying learned skills. The series provides content reading in social studies, science, and mathematics and builds vocabulary and concepts in these fields while also developing self-understanding and appreciation of others. The supplementary anthologies are designed in developmental sequence to correlate with language development. They would best be used with small group or individualized instruction and may be sources of special activities for learning centers in elementary classrooms.

Rationale:

Reading Caravans has been designed as a supplementary reading program to present high interest material of literary worth in a developmental program. Reading selections and correlating lessons attempt to develop critical reading and creativity while extending and providing application of basic skills.

What: Science Curriculum Improvement Study (SCIS)

Developed by Science Curriculum Improvement Study
University of California
Berkeley, California 94720

Published By:

Rand McNally and Company
Box 7600
Chicago, Illinois 60680

How To Order:

Order from publisher.
List price: Prices for the materials vary. See the publisher's catalog.
Consumable items: See publisher's catalog.

Description:

The Science Curriculum Improvement Study is an experience-oriented enrichment program in science for the elementary grades. The program is intended to provide an intellectual and stimulating introduction to science for the elementary school child. Each unit is presented in a way which is consistent with the child's intellectual growth and is designed to develop a hierarchy of levels of abstraction.

The SCIS program approaches science in a flexible and open-ended manner by stressing actual manipulation of materials and experimentation by each child. In each unit the children must suggest hypotheses, deduce logical consequences of these hypotheses, and design simple experiments to test the predicted consequences. It gives the children extensive direct contact with a natural phenomena. Observations which the children collect themselves furnish the necessary background information for higher levels of abstraction.

Three types of lessons have been developed in this program. Exploration lessons give each child, individually and in groups, direct experiences with materials and systems. Invention lessons describe or explain what the children have observed in the exploration lessons in terms of "invented" scientific concepts. Discovery lessons give the children opportunities to apply their new ideas in an open-ended nanner where divergent paths of thinking can be encouraged and new questions can be raised. These lessons are all designed to teach children to look at natural phenomena from a modern scientific point of view.

Target Audience:	Elementary grade levels 1-8.
Materials Provided:	One materials kit. Each unit of the SCIS program contains one equipment kit with enough materials for 30 children to perform experiments. The items are packed in a cardboard box with drawers for convenient removal, use, and reuse. The equipment kits can also be conveniently shared among cooperative teachers.

The Interaction and System Unit, for example, explains the idea that a change may often be interpreted as evidence of interaction. The equipment kit for this unit provides enough materials for 30 students to investigate interactions and systems: pulley systems, dissolving (copper chloride, aluminum), interaction-at-a-distance (magnetism), and electric circuits. Drawer one stores all necessary containers of chemical supplies. Drawer two contains chemical supplies. Drawer three contains various pulley systems.

Drawer four contains assorted materials such as aluminum wire, "mystery pictures," photographic paper, paper pads, a bottle ammonia, candy balls, electric circuit puzzle folders, etc. Drawer five stores various sized magnets, compasses, and other types of electric systems.

Student manuals. Accompanying each unit are manuals in which students record the objects they used in their experiments and their observations of the experiments.

Teacher's manual. This helpful guide to each unit outlines the unit to be investigated, describes the design and use of the kit, and provides an overview of the SCIS program. Each unit is divided into chapters which identify what materials are to be used in the investigation and where to find them in the kit. The rationale for the investigation is provided, teaching strategies are suggested, and behavioral objectives are defined.

The SCIS Elementary Science Sourcebook contains background papers and suggestions for classroom teaching and laboratory experiences. Films are available which contain representative activities from the Life Science program and the Physical Science program. These films are available from Extension Media Center, 2223 Fulton Street, Berkeley, California 94720 (purchase). In-service teacher education programs are also available in which the theoretical foundations are discussed and various related laboratory activities are undertaken by developers of the program.

Teacher's Guide:

The aims of the SCIS program cannot be achieved without the imagination and enterprising contributions of teachers who have ideas, see new possibilities, and are sensitive to the reactions and comments of children.

It is recommended that both the Sourcebook and the individual teacher's guide that accompanies each unit be used in guiding the teacher to an effective implementation of the activities in the unit. Both guides provide the teacher with crucial information about the nature of the SCIS program - its theoretical foundations, its science background, the materials used in it, and some of the practical considerations included in carrying out the program in the classroom.

Subject Matter and Teaching Strategy:

The Science Curriculum Improvement Study Elementary School Science Program is divided into two sequences. The Physical Science sequence consists of six basic units (Material Objects, Interaction and Systems, Subsystems and Variables, Relative Position and Motion, Energy Sources, and Models: Electric and Magnetic Interactions) which introduce and develop fundamental concepts of change and interaction. The Life Science sequence consists of 6 basic units (Organisms, Life Cycles, Populations, Environments, Communities, and Ecosystems) which concentrate on organism-environment interactions. Each sequence elaborates four scientific concepts: matter, energy, organism, and ecosystem. In addition to the scientific concepts, process-orientated concepts (property, reference, frame, systems, and model) are introduced and developed during the activities of observing, describing, composing, classifying, measuring, interpreting evidence and experimenting.

SCIS provides the children with extensive direct contact with natural phenomena. Observations which the child collects himself furnish the necessary background information to proceed to higher levels of thinking. A "discovery approach" is employed to develop some understanding of the conceptual structure of science and to allow the child to gain a "feel" for science experiences.

Creativity can be developed in the child by setting up situations which allow children to view phenomena from different frames of reference, and bringing in new materials that provide new insights for children. Giving the children the opportunity and freedom to express ideas and try them out, verbally and physically, will give them a great chance to experiment. The children should believe that the teacher does not have one answer in mind which they are to duplicate. Respect for unusual answers and questions helps to develop this belief.

Rationale: The SCIS program is based upon current implications of the modern view of science and upon developmental principles of thinking.

Children need direct experiences with materials if the scientific concepts which constitute understanding are to have any meaning. They should engage in investigations to develop their understanding of the modes of operations that are to be used in the sciences. As children are introduced to various ideas and discover operational meanings of these ideas, they develop and extend their own conceptual structures. With sufficient guidance and discussion, children are aided in their interpretations of phenomena and in relating their experiences to other science experiences. Emphasis upon "divergent" questioning in the SCIS activities leads children to seek new relationships between activities. Through their science experiences, children become aware of the tentative nature of truth and the importance of adopting a questioning attitude towards statements.

The SCIS program presents its material in a manner consistent with the pace of the developing comprehension of children. Beginning at the kindergarten and first grade level when most children are "preoperational" in their thinking (i.e. can carry on procedure if given step-by-step instructions but cannot perform as well when confronted with similar tasks in a different situation), it provides opportunities to facilitate progress in "concrete operational thought" (i.e. can abstract from the one situation to another similar in nature with understanding). Thus, SCIS relies heavily on the teacher's judgment of the comprehension ability of students. The success of the SCIS program depends on the teacher's understanding of the concepts to be presented to the children and on the teachers' knowledge of the intellectual processes that are involved in the formation of concepts by young children.

Research or Evaluative Evidence:

Children, teachers, scientists, science educators, and psychologists have all been involved in the development of this elementary science program. Versions of the lessons were drafted and taught in several schools of varying socioeconomic and cultural backgrounds in the Berkeley (California) area. Preliminary editions were then tried for two years in various elementary schools associated with SCIS. These editions were then revised and published in their present form. The program is still being developed and optional units are being conceived. For up to date information, schools can contact project headquarters in Berkeley.

For Further Reading:

Theoretical discussion

Karplus, R. *Theoretical background of the Science Curriculum Improvement Study*. Berkeley: Science Curriculum Improvement Study, University of California, 1965.

Jacobson, W., and Kondo, A. *SCIS Elementary Science Sourcebook*. Berkeley: Science Curriculum Improvement Study, University of California, 1968.

General discussion

Karplus, R., and Thier, H. D. *A new look at elementary school science*. Chicago: Rand McNally, 1967.

SCIS and the disadvantaged. Berkeley: Science Curriculum Improvement Study, University of California, 1970.

What: The Spice Series

Educational Service, Inc.

Published By:

Educational Service, Inc.
P. O. Box 219
Stevensville, Michigan 49127

How To Order:

Order from publisher.
List price: $4.60 per book
Consumable items: duplicating masters $4.60 each

Description:

The Spice Series consists of twelve handbooks of ideas particularly chosen to aid the teacher in motivating student interest in classroom subjects. Each handbook contains directions for preparation, lists of materials needed, and instructions for students for class activities, games, projects, and experiments. Many art and creative writing ideas are presented in the series.

Target Audience: Kindergarten - grade 6.

Materials Provided:

Each title in the Spice Series is an individual handbook which may be purchased separately from the others. A list of materials follows.

Spice. A handbook of language arts teaching ideas to be used with kindergarten through fourth grades. The activities, games, and lessons suggested in the book are designed to add interest and motivation to the regular language arts program.

Spice Series Duplicating Masters.
Volume 1: grades kindergarten through two.
Volume 2: grades two through four.

Probe. A handbook of ideas for teaching elementary science. The lesson ideas were chosen to stimulate children to find question-provoking aspects of their environment and search for answers. The handbook emphasizes activity and discovery methods of teaching and learning. Ideas are included to help teachers promote scientific speculation, to help them set up simple experiments, and to help them teach simple concepts by the inquiry method.

Plus. A handbook of ideas for motivating interest in elementary mathematics.

Spark. A handbook of ideas for motivating interest in elementary social studies.

Create. A handbook of ideas for art activities. Using easily found materials, the art activities allow students opportunities to be truly creative with new ideas and to approach old ideas and materials from a new perspective. Many ideas can be adapted for use with language arts, social studies and science projects.

Action. A handbook of ideas for motivating interest in elementary physical education.

Stage. A handbook of ideas which allow students to be creative in dramatic activities. Suggestions are included for choral readings, class plays, pantomime, role-playing, and impromptu skits. Many ideas do not require staging or special materials. Instructions are included to aid teachers in producing more elaborate stage productions requiring scenery, properties, costumes, lights, and sound effects.

Rescue. A handbook of ideas for promoting interest of remedial students in reading.

Anchor. A handbook of ideas for motivating interest in language arts in grades four through eight.

Pride. A handbook of black studies techniques which helps Black students develop positive self-concepts and pride, and knowledge of black history, African geography, African animals, and famous Black people.

Launch. A handbook of ideas to motivate interest in learning for teachers of preschool and kindergarten children.

Flair. A handbook of ideas for teachers to use in motivating student interest in creative writing. Writing activities which capture student interest are suggested. Creative writing and poetry forms such as haiku, syo, and diamontes are illustrated.

Teacher's Guide: Each idea entry in each handbook contains specific directions for carrying out that activity.

Subject Matter and Teaching Strategy: The *Spice Series* consists of twelve books which cover topics in the elementary school curriculum. Many ideas can be adapted to serve several purposes. Activities in one subject can be designed to correlate with studies in another subject. Teachers will find ideas for enrichment, remediation, total class projects, small group activities, and individual seatwork. Many can be adapted to fit a learning center or a self-instructional format.

Rationale: The *Spice Series* is a group of teacher handbooks which provide teachers with suggested activities for creative thinking and practical ideas for making learning fun and interesting for children. They are written from the point-of-view that children are interested in what's happening in the here and now and not in learning to be prepared for the future.

What: Story Series 3: About Problems Solving

Published By:
BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

How To Order:
Order from publisher.
List price: $26.00.
Consumable items: None.

Description: These two stories are concerned with an understanding, affectionate, middle class Black family. In the first story Mary Jo, a five year old, overcomes her fears and self-doubts and manages to share something with her class. The concepts the film attempts to teach include: overcoming one's shyness, doing something about it, accepting disappointment in solving difficult problems, trying other solutions and solving one's own problems.

In the second story Mary Jo asks for and gets a puppy. She accepts the responsibility of caring for the puppy and for solving certain problems. The story attempts to get across the concepts of the joy and responsibility of pet care, the care baby animals need, and the duties of the owner.

Target Audience: Primary and lower elementary grades

Materials Provided:
One cardboard storage and carrying case
Two film strips
Two records
One teacher's introductory statement

Teacher's Guide: This is a one-page fold out which gives a synopsis of the film, the concepts being taught, and questions for discussion.

Subject Matter and Teaching Strategy: The stories are primarily intended for language arts and literature. However, they could be adapted to other areas.

The whole class, small groups or individuals can use the material since it is of the sound filmstrip variety. These sound filmstrips would also be useful discussion starters.

Rationale: These stories are helpful in teaching children that they can solve their own problems. The stories show the importance of taking the responsibility for the solution of one's own problems. This can be seen in the main character's resolve and in her ability to take an active part in the solution of her problems.

What:	Story Starters--Intermediate Level Primary Level
Published By:	Creative Teaching Press, Inc. 514 Hermosa Vista Avenue Monterey Park, California 91754
How To Order:	Order from publisher List price: $4.95 Consumable items: None
Description:	Story Starters brings together 50 illustrated ideas that interest and motivate students to creatively express themselves. Each Story Starter card presents an interesting situation that the child can write about and extend. The subjects that are dealt with are those that are most stimulating and relevant to the experiences and imagination of young children. Many involve adventure and fantasy and require good use of the imagination. Some of the subjects involved are buried treasure, castles, sports, and animals.
Target Audience:	Set 1, Intermediate elementary Set 2, Primary
Materials Provided:	Fifty 5" x 8" cards of story starters, accompanying illustrations, and word lists. Teacher's Guide. Suggestions to the student.
Teacher's Guide:	Each kit includes suggestions for the

teacher on how to use Story Starters. The suggestions describe various set-ups for individual and group use.

Subject Matter and Teaching Strategy:

Story Starters may involve an entire class working on one idea at a time. For more individualized situations, a writing center is suggested where students may choose their card and work on it.

Children may also illustrate their stories, and present them to the class as a project. For a project, students could dramatize their stories individually or in groups for presentation to other classes, parents, or the teacher.

Rationale:

Story Starters uses a variety of writing experiences to develop children's creative thinking abilities. Children are motivated by using relevant, interesting, and exciting subject matter. The combination of illustrations, ideas, and suggested words provides the motivating force for unlocking their individuality and developing skills.

What: The TABA Program in Social Science

H. Taba

Published by:

Addison-Wesley Publishing Company, Inc.
School Division National Headquarters
Sand Hill Road
Menlo Park, California 94025

How to Order:

Order from publisher.

List price: Prices vary from grade level to grade level. See publisher's catalog for details.

Consumable items: Booklets of duplicating masters of evaluative exercises are available for each level.

Description:

The TABA Social Science Program is a well planned and integrated social studies curriculum. The objectives of the program are to 1) develop student thinking skills, 2) familiarize the student with the forces that control societies (such as tradition, power, and conflict), 3) aid the student in developing values and in understanding the values and feelings of others, and 4) develop students' academic and social skills. These objectives are accomplished with an emphasis on discovery and inquiry, into the ways in which people live, interact with others and their environments, and change their life styles.

Target Audience:

There are seven levels to the program, each specific for a grade K - 6.

Materials Provided:

Available materials include:

Activity Books (Gr. 3-5)
Student Textbooks

A booklet of duplicating masters containing objective performance assessing exercises (Gr. 3-6)
Cassette Tapes and Records containing appropriate sounds, music and narrative

Teacher's Guide:

The teacher's guide at each level contains a rationale for the materials that are covered in the text, behavioral objectives, general hints to the teacher, and suggestions for further reading. The program for a year is outlined unit by unit, each having a statement of the main and organizing ideas, contributing ideas, and key concepts that the unit is to emphasize. Class procedures are suggested, relevant activities described, and extensive lists of further reading materials are included.

Subject Matter and Teaching Strategy:

The *TABA Program in Social Science* is designed to be a complete social studies curriculum. As such, it is best used as a regular part of classroom procedure. However, traditionally separate areas of instruction may be enhanced by the TABA series. For example, the extensive biographies offered in the teacher's guide may be useful sources for book reports or other areas of literature study.

Rationale:

The *TABA Program* is based on the rationale that an efficient, useful curriculum is predicated upon well-structured objectives, and that a program should be very closely attuned to those objectives. *TABA* is built upon the belief that thinking skills can be taught in terms of necessary cognitive tasks. These tasks are 1) developing concepts, 2) attaining concepts, 3) developing generalizations, and 4) applying generalizations. The materials are directed towards helping children handle facts and concepts, manipulate them, and extend what they have learned through inference, deduction, and generalization.

Research or Evaluative Evidence:

This program has been highly evaluated in many schools. The interested reader is referred to the reference listed below for research and findings on problem solving and learning as related to the development and evaluation of this curriculum program.

For Further Reading:

Theoretical discussion

Taba, H. Implementing thinking as an objective in social studies. *National Council for the Social Studies*, 1967, *37*, 25-49.

What: *Think-Ins*

Sandra Nina Kaplan
Sheila Kunishima Madsen

Published By:
Creative Teaching Press, Inc.
514 Hermosa Vista Avenue
Monterey Park, California 91754

How To Order:
Order from publisher.
List price: $6.95
Consumable items: None.

Description:

Think-Ins is a series of 30 task cards that provide ideas and suggestions to stimulate creative thinking and problem solving.

Each card is on a different topic that concerns mankind and his environment, and presents a challenge, things to think about, suggestions for activities, plus ideas for further inquiry. Sample topics are propaganda, education, overpopulation, garbage and health. The problems that are presented in the challenge are to be solved through the processes described in the sections that follow. Hypothesizing, researching, discovering facts, and drawing conclusions are some of the processes that the student practices and should learn from the program.

Target Audience: Grades 4-12.

Materials Provided: Thirty task cards made of heavy paper, with the challenge and other sections, and an accompanying photograph.

Teacher's Guide.

Teacher's Guide:

An introduction to the teacher is presented that explains the format and rationale of the set.

Subject Matter and Teaching Strategy:

Each activity is directed towards the individual student, who should consider the problems alone, and work out his or her own solutions. The series can be used in a learning center, for independent studies, and as enrichment activities. The further research section suggests ideas for more in-depth research that could be useful as projects and long-term assignments.

Rationale:

Think-Ins is based on the concept that students should become involved in topical problems, situations, and ideas, and should actively generate their own hypotheses and solutions pertaining to those problems. This process is designed to encourage and develop problem-solving skills and facilitate individual expression.

What: The Think Tank

Savo Bojicic

Published By:

Think-Tank Corporation
2215-7 Midland Avenue
Scarborough, Ontario, Canada M1P3E7

How to Order:

Order from publisher.
List price: $15.00.
Consumable items: None.

Description: The Think Tank is a plastic sphere filled with approximately 13,000 different words. It is equipped with a shuffling device to mix and present the words randomly at a window. Children draw words at the window and use them in making an association to solve a problem presented by the teacher.

Target Audience: The Think Tank can be used at all grade levels, but it contains some moderately difficult words such as battlement, carbolic, gantry, and cuckold.

Materials Provided:

One Think Tank

One Instruction Booklet

Teacher's Guide: The instruction booklet explains the function of the Think Tank, provides ideas for its use, and offers rationale for its success.

Subject Matter and Teaching Strategy: The Think Tank can probably best be used by individual children at a learning center. Because of its unique verbal orientation, it can be used in conjunction with a language arts program.

The Think Tank stimulates the generating of ideas by providing random words that are to be associated by the pupil and by directing these associations toward the solution of a specific problem. The Think Tank itself does not generate ideas. It merely provides random words. The meanings and associations that emerge from these random words must come from its user. By taking the function of a word, its associated meaning, or its suggestion of another word which has the same sound or spelling and directing these diverse ideas toward the solution of a specific problem, the problem solving ability of the pupil is enhanced.

Rationale: The Think Tank is a device for generating random words. These random words can be used to generate a variety of different meanings and associations in a way which generates novel solutions to a particular problem. By deferring judgment and forcing ideas to move and combine into unique relationships with other words, flexible and fluent thinking is fostered in the pupil.

The developer of Think Tank conceives creativity as the "unnatural behavior of a patterning system." By using an idea as a stepping stone to another idea, not caring whether an idea is right or wrong but only caring with where it leads, fluent thinking is fostered. An idea which is actually wrong or contradictory may lead somewhere. Creative thinking is concerned with exploration not with proof. Above all it is concerned with generating new ideas.

For Further Reading:

General discussion

deBono, E. *The five day course in thinking*. New York: Basic Books, 1965.

On the attribute-listing method

Crawford, R. P. *Techniques of creative thinking*. New York: Hawthorn Books, 1954.

On the association method

Gordon, J. J. *Synectics*. New York: Harper & Row, Inc., 1961.

What:	A Total Creativity Program for Individualizing and Humanizing the Learning Process Frank E. Williams
Published By:	Educational Technology Publications 140 Sylvan Avenue Englewood Cliffs, New Jersey 07632
How To Order:	Order from publisher. List price: $59.95. Consumable items: None.
Description:	The Total Creativity Program is designed to give teachers the practical help they have been seeking in identifying, encouraging, and assessing children's creative talents in the classroom. It provides classroom teachers, curriculum supervisors, and building principals with assessment and identification measures, teaching strategies, resource listings, lesson plans, posters, and demonstration lesson audio tape cassettes in the area of creativity. Many examples of applied activities for creative thinking and feeling in the elementary school program are offered. A number of activities are suggested for teachers to use in modifying or elaborating on the Total Creativity Program in order to meet their own individual classroom needs.
Target Audience:	Kindergarten through upper elementary grades.
Materials Provided:	The Total Creativity Program consists of

eleven components which are packaged in a vinyl carrying case:

Volume 1 - Identifying and Measuring Creative Potential. This book presents various observational and assessment measures for the classroom teacher to aid in identifying and measuring the thinking and feeling processes which contribute to creativity.

Volume 2 - Encouraging Creativity Potential. This book offers a repertoire of activities and strategies which can be used to encourage each child's creative potential.

Volume 3 - Teacher's Workbook. This workbook provides teachers and teacher trainers with supplementary instruments, checklists and worksheet exercises for observing and assessing teacher and pupil creative behavior. The checklists and worksheets may be detached and reproduced.

Volume 4 - Media Resource Book. This book offers an extensive listing and classification of books, films, and currently available curriculum materials to teach creative thinking and feeling.

Volume 5 - Classroom Ideas for Encouraging Thinking and Feeling. This book offers over 380 lesson-plan ideas to stimulate creative thinking in a variety of subject areas (i.e. language arts, social studies, science, arithmetic, art-music). The suggested lessons call for processes of inquiry, discovery, and creative problem solving.

Poster Set 1 - Thinking-Feeling Processes. This set of eight black-and-white posters depicts each of the thinking-feeling processes stressed in the Program.

Poster Set 2 - Teaching Strategies. This set of nineteen black-and-white posters depicts each teaching strategy recommended for use in the program. One poster in this set gives an overview of the conceptual model used in the Program.

Teaching Strategies Packet. This packet of nineteen cards describes specific examples of a strategy that can be used to inspire the creative thinking and feeling of pupils in five subject areas of a curriculum.

Teacher Training Audio Tape Cassettes. One cassette, entitled "Creativity: A Bridge Between Thinking and Feeling," presents information on the rationale for the teaching of creative thinking and feeling. A second cassette, entitled "Demonstration Lesson," presents actual classroom sessions in which the principles of this program were originally field-tested.

Teacher's Guide:

The Instructor's Manual explains the use and rationale of the materials in the kit, offers a suggested sequence for applying the program and using the kit, and contains instructions for using the demonstration lessons cassette. Transcripts of the "demonstration lessons cassette" are included.

Subject Matter and Teaching Strategy:

The Total Creativity Program may be used on a daily basis throughout the school year within the existing curriculum. The teacher is encouraged to select activities or materials from the program to meet specific class needs or interests. The activities and strategies which are offered can be applied to regular classroom practices to encourage thinking and feeling in pupils as they learn regular subject matter (i.e. language arts, science, arithmetic, social studies, art-music).

Rationale:

The Total Creativity Program has been designed around a conceptual model which emphasizes teaching creativity through subject matter content. This model emphasizes four intellective behaviors and four feeling behaviors appropriate to productive-divergent thinking: fluent thinking, flexible thinking, original thinking, elaborative thinking and curiosity, risk-taking, complexity, and imagination.

The Program is based upon the rationale that there are mental abilities and emotional capacities of children that are untapped by traditional teaching methods, that these untapped abilities and capacities can be systematically utilized while simultaneously learning subject matter content, and that the most effective means for doing this is through the use of multiple teaching strategies.

Research or Evaluative Evidence:

The Total Creativity Program has been extensively field-tested over the past five years as a part of the National Schools Project. Hundreds of teachers and educational specialists have contributed to the research and development of the ideas and design of this program.

For Further Reading:

On Theoretical Discussions

Williams, F. E. National Schools Project Final Report. U. S. Office of Education, Washington, D. C., April, 1968.

Williams, F. E. Models for encouraging creativity in the classroom by integrating cognitive-affective behaviors. Educational Technology Magazine, 1969, 9 (12).

On General Discussion

Torrance, E. P. Rewarding creative behavior. Englewood Cliffs, New Jersey: Prentice-Hall, 1965.

Torrance, E. P. Encouraging creativity in the classroom. Dubuque, Iowa: William C. Brown Company, 1970.

What: *Wonderwork*

Margaret S. Woods

Published By:

D. O. K. Publishers, Inc.
771 East Delavan Avenue
Buffalo, New York 14215

How To Order:

Order from publisher.
List price: $2.25.
Consumable items: None.

Description:

Wonderwork presents a series of experiences of the elementary school child designed to arouse curiosity and encourage the child's spontaneous expression through dramatic play, creative art and creative dramatics. It is a guide for teachers who work with children in nursery school, kindergarten, libraries and the home. It suggests how to release a child's unique potential through learning experiences initiated by teacher and learner.

With the aid of various audio-visual materials (i.e. recordings, poems, storybooks) the teacher arouses the curiosity of the children about a particular aspect of the world around them. Questions are also used to open children's interest and imagination to a variety of things such as caterpillars, leaves, Jack Frost, spiders, and so on. A poem is presented to develop a picture of the theme being discussed. The themes are generally oriented to the four seasons of the year. Spontaneous expression with feeling and movement is encouraged by the use of various "let's pretend" exercises in which the children become the thing being talked about (e.g. a spider, a jack-in-the-box, a leaf, etc.) and, with the aid of music, dance and play, moving just as these things would move. Each child communicates his/her own unique ideas and feelings to peers. Inquiry and discovery are fostered through supplementary activities in which each child explores other dimensions of the topic being discussed.

Target Audience: Nursery school and kindergarten.

Materials Provided: One *Wonderwork* booklet

Teacher's Guide: The *Wonderwork* booklet is a guide for teachers and parents which provides interesting suggestions on how to develop the capacity for wonder in the young child. Many recordings, poems, and picture books could be used with the *Wonderwork* booklet. Teachers are encouraged to make their own choice.

Subject Matter and Teaching Strategy: *Wonderwork* guides are planned for use in the various seasons of the year. Each unit deals with appropriate events and objects that occur during these seasons. The first series of *Wonderwork* guides, for example, are planned for use in the fall and early winter seasons. The subject matter for this series deals with hinges, leaves, maple wings, caterpillars, spiders, dandelion plants, Halloween, a bottle floating in the sea, Jack Frost, Thanksgiving, Jack-in-the-box, and Christmas trees. Various learning objectives for each lesson are given, each objective designed to enhance the awareness, sensitivity, and appreciation of the things discussed in each lesson.

Curiosity becomes aroused when each child is asked to describe his/her experiences or wonder at the things under consideration (eg. "Have any of you ever seen Jack Frost?", "Who knows the caterpillar's secret?"). Expression is encouraged by "let's pretend" exercises. This expression, sensitively recognized by the teacher, becomes a joyful source of communication for the child.

Rationale: Wonderwork is based upon the rationale that a child can learn many valuable things if his/her curiosity is aroused and if productive learning experiences are provided. The experiences require channels for expression to guide and facilitate the flow of feelings which accompany the learning experience. These channels are optimally open through dramatic play, creative art, and rhythmic movement. Such meaningful learning experiences provide a wealth of materials for further activities in learning.

Research or Evaluative Evidence: The author, Margaret Woods, has served as Director of the National Workshop on Creative

Education for the Elementary - Kindergarten - Nursery Education Department of NEA and was director of the Children's Worlds for Creative Learning and Teaching at both the Seattle and New York World's Fairs.

For Further Reading:

General discussion

Torrance, E. P. Encouraging creativity in the classroom. Dubuque, Iowa: William C. Brown and Company, 1970.

Williams, F. Classroom ideas for encouraging thinking and feeling. Buffalo, New York: D. O. K. Publishers, Inc., 1970.

Woods, M. S., and Trithart, B. Guidelines to creative dramatics. Buffalo, New York: D. O. K. Publishers, Inc., 1970.

What: *The World of Mankind*

Follett Publishing Company

Published By:

Follett Publishing Company
1010 West Washington Boulevard
Chicago, Illinois 60607

How to Order:

Order from publisher.
List price: See publisher's catalog.
Consumable items: None.

Description:

The World of Mankind is an interdisciplinary elementary social science program which teaches concepts from anthropology, economics, history, geography/ecology, political science, sociology, and social psychology. Information is presented in narrative form supplemented by questions and suggested activities which emphasize problem solving and inquiry skills. The books are extremely well designed and include many full-color photographs.

Target Audience: Grade levels 1-8.

Materials Provided:

Textbooks with the titles given below are available. Each is written to meet most of the social science needs for a particular grade level. Each textbook includes narrative, colorful pictures, maps, content questions and suggested activities.

People in Our World (Level 1)
The Groups We Belong To (Level 2)
The Communities We Build (Level 3)
The Environments We Live In (Level 4)

Man the Toolmaker (Level 5)
Cultures in Transition (Level 6)
America: Values, Institutions and Conflict
(Junior High)
America: Progress, Power and Potential
(Junior High)

A teacher's edition is available for each level. For levels three through junior high a workbook and teacher's workbook guide are available.

Teacher's Guide:

The World of Mankind teacher's editions which accompany each student textbook provide many supplementary materials such as background reading, discussion questions and suggested activities. Behavioral objectives are stated, concepts are discussed and defined according to the social science discipline they represent, and discussion information is added. The teacher is also guided in use of inquiry procedures for specific topics covered throughout each student textbook.

Subject Matter and Teaching Strategy:

The World of Mankind is a series of content oriented textbooks intended to cover most social science topics of instruction in elementary school and junior high school. The textbooks attempt to teach concepts by building up generalizations and leading students to discover the concepts. The inquiry approach is also used. The teacher's edition offers background material and suggested activities which can be used as aids in individualizing instruction. In general, the content may be used most easily with total class participation.

Rationale: *The World of Mankind* introduces content in such a way that students learn to form concepts from generalization and to form hypotheses and predictions from what they have read. The interdisciplinary approach is used to present information and encourage students to weigh values and principles from many cultures and subcultures so that they learn to evaluate alternatives.

What:	World of Sound Wilma Longstreet
Published By:	H. Wilson Corporation 555 West Taft Drive South Holland, Illinois 60473
How To Order:	Order from publisher. List price: LP - $11.90; 5-inch reel-to-reel - $15.80; Cassette - $15.80. Consumable items: None.

Description:

World of Sound has one major purpose and that is to help children learn to listen. The recordings make young people aware of the rich diversity of sounds that surround them and stimulate their imaginations in relation to what they hear.

The material is presented in the form of stories and games that are concerned with familiar places, people and sounds. All of the segments require children to listen carefully and imagine the setting, circumstances, and outcome of the sounds they experience. Some exercises present a series of sounds, add a story built around those sounds, and then ask the listeners to create their own stories. The important objective in every case is to make children more aware of sounds and their experiences with them.

Disadvantaged children will particularly enjoy this set in that many of the sounds and stories are urban in nature. The overall consideration is to make the elements of World of Sounds relevant and enriching for all children.

Target Audience: Kindergarten to grade 3.

Materials Provided: Recorded material is in the form of either 2 12-inch records, 4 5-inch reel-to-reel tapes, or cassettes.

Teacher's Guide.

Teacher's Guide: The written introduction to *World of Sound* states the purposes and uses of the series. Each of the four parts is described and possible instructional methods are given for the teacher.

Subject Matter and Teaching Strategy: The flexibility of the series is stressed in that many uses may be found for it. The materials may be used as story starters for compositions and discussions by the class or small groups. Individualization in a large group is possible since an entire class can hear the material at one time and respond to it in their own way. Writing may or may not be involved in the classroom procedure or all work can be oral.

The recordings could be used as part of a learning center where children could use the exercises at their own rate when their regular work is completed.

The series can serve as a specialized segment of a language arts curriculum and may best serve the teacher who feels that enrichment of listening and creative skills is necessary.

Rationale: World of Sound arises from a conviction that listening is much more than hearing. By carefully attending to the rich, complex patterns of everyday sounds, children can enhance their experiences and be better able to consider and creatively extend what they have known.

What: The Writing Center

Published By:
Winston Press
25 Groveland Terrace
Minneapolis, Minnesota 55403

How To Order:
Order from publisher.
List price: $24.00.
Consumable items: Lined writing paper.

Description: The Writing Center is designed to stimulate children's imaginations and provide encouragement for creative writing. The ideas presented in the kit spark imagination and help children develop their writing skills.

Target Audience: Grades 3 through 8.

Materials Provided: The Center includes 49 "Idea Generators," each a thick cardboard sheet (8¼" x 10¼") with a color illustration or photograph and suggestions for writing about the ideas, objects, or events. The Ideas are categorized into five (5) areas: adventure, mystery, fantasy, animals, and poetry.

Lined paper is also included.

Teacher's Guide: For teacher use, a description of kit objectives with suggestions for use and evaluation is included.

Subject Matter and Teaching Strategy: Each "Idea Generator" can serve as a basis for individual writing and discussion. Children can write their own stories and ideas alone, or participate in group discussion on the illustrations. The Writing Center may be used to its fullest advantage as a weekly activity.

Rationale: The Writing Center uses imaginative activities as the basis for developing creative thinking. Through the encouragement and practice in creative writing that is provided by The Writing Center, the child gains experience and confidence in creative production.

Book and Film Reviews

AIDING BASIC CREATIVITY

Huger J. Sloan, Jr. (Ed.)

1971

List price: $3.95

How to order: T. S. Denison and Company, Inc.
5100 West Eighty-second Street
Minneapolis, Minnesota 55437
(Order No. SGN-513-0111[illegible]-[illegible])

Aiding Basic Creativity offers the elementary classroom teacher a host of ideas on stimulating and motivating art experiences for pupils. Over twenty activities are suggested for each grade level. The teacher is told what materials are needed for the activity and how to direct it. Ideas on how to extend or modify the art experience with other work of children who have completed the art activities are included at the end of the book. Different kinds of drawing, painting and carving techniques are described throughout.

This attractive book provides elementary school art teachers with easily understood guidelines and art activities for their pupils. Each activity can be modified to meet the needs and interests of the children.

CHANGE FOR CHILDREN: IDEAS AND ACTIVITIES FOR INDIVIDUALIZED LEARNING

Sandra Kaplan, Jo Ann Kaplan, Sheila Madsen, Bette Taylor

1973

List price: $1.95

How to order: Goodyear Publishing Company, Inc.
Pacific Palisades, California 90272

Change for Children provides a guide and model for elementary teachers to help develop the creative ability of pupils. Change for Children focuses the teacher's attention on how pupils learn by suggesting ways of varying the teaching and learning processes according to the interests, preferences, learning styles, abilities and achievements of pupils. Practical ideas are given for individualized learning, developing and using learning centers, providing for student directed activities, record keeping and evaluating ideas. Worksheets for reproduction are also included in this handy book.

Change for Children is an easily referenced source of novel ideas for the teacher who wants to do more in individualizing instruction and reinforcing the creativity of pupils through activities which stress originality of content and use of material.

CLIMATE FOR CREATIVITY

Calvin W. Taylor (Ed.)

1972

List price: $11.50

How to order: Pergamon Press Inc.
Maxwell House
Fairview Parle
Elmsford, New York 10523

Climate for Creativity is a collection of papers presented to the Seventh National Research Conference on Creativity. Dealing primarily with applied areas, Climate for Creativity includes numerous articles concerning creative development and innovation. Current research in prediction and maintenance of creativity is also explored.

Climate for Creativity contains many good discussions on the importance of environment in relation to creative development and growth. While much of the book focuses on creativity in business and industry, many of the suggestions offered are applicable to teaching situations.

CREATING PLAYS WITH CHILDREN

Sandra Sanders

1973

List price: $1.25

How to order: Citation Press, Professional Relations Division
Scholastic Magazines, Inc.
Editorial Office: 50 West 44th Street
New York, New York 10036

Dramatics can be a creative and satisfying experience for elementary school children. Creating Plays with Children explains how easily dramatics can be handled in elementary grades as a classroom presentation or a large auditorium production.

The booklet stresses spontaneity and creativity by the students. It offers the teacher guidelines for dramatics in the elementary grades. Tips on choosing a scene, casting and rehearsing, writing a script, and acting out the scene are presented. Several plays that can be performed are given at the end of the booklet.

Creating Plays can be read quickly and easily. Through dramatics, the teacher can increase students' appreciation of literature and also help them learn to express their creativity in an individualized and interesting manner.

A CREATIVE APPROACH TO AMATEUR THEATER

Robert G. Newton

1967

List price: $6.75

How to order: J. Garnet Miller LTD.
13 Tottenham Street W.I
London, England

A Creative Approach to Amateur Theater combines three books by Robert Newton (Together in Theater, Exercise Improvisation, and Improvisation Steps Out) into one compact volume. The first of these books is primarily theoretical and deals with the nature of theater and of acting and with the importance of a cooperative relationship among participants in a stage production. Exercises and examples that can be used to help students learn about the acting profession by experiencing it firsthand are provided at the end of the first book and frequently throughout the second and third books.

Newton's book can be read rapidly and easily due to the author's casual style and the fascinating nature of the exercises provided. The creative exercises should aid drama teachers in motivating their students. Although Newton often speaks of students in general rather than students of a particular age, it does seem that the exercises provided would fail to appeal to pupils younger than about age twelve. However, perhaps with some improvising the exercises can be made to appeal to younger children and ample instruction in improvising is provided in A Creative Approach to Amateur Theater. This book would seem to be useful to both teachers and students of the dramatic arts.

CREATIVE ART FOR THE DEVELOPING CHILD: A TEACHER'S HANDBOOK FOR EARLY CHILDHOOD EDUCATION

Clare Cherry (Ed.)

1972

List price: $5.25

How to order: Lear Siegler, Inc./Fearon Publishers
6 Davis Drive
Belmont, California 94002

This 186 page paper bound book, which can be used in parts or as a whole, is an excellent source book for the pre-school teacher interested in creative art for 2 to 6 year olds. The author's approach is distinctly humanistic and personal. She points out the need for a teacher to be sensitive to students and aware of the affect involved in creative art. A good discussion of the physical limitations and developmental sequence of 2 to 6 year olds is also included.

The book contains 13 chapters which are primarily concerned with materials found in the common art room. The first chapter is a good introduction to the implementation of the creative art program. It tells how to establish ground rules, describes the art room and materials, and briefly describes how to evaluate the child's progress.

Examples of the titles of the remaining chapters include "paper," "color," "crayons," "paints," "paste," and "styrofoam." Each of these chapters contains various activities for children. The chapters also supply important technical information, tell what materials are required, and discuss that the teacher may expect from these activities. Each chapter is descriptive, easy to read, illustrated, and contains variations on each task.

CREATIVE ARTS AND CRAFT ACTIVITIES

Arthur S. Green (Ed.)

1967

List price: $5.98

How to order: T. S. Denison and Company
5100 West 82nd Street
Minneapolis, Minnesota 55437

Creative Arts and Craft Activities provides hundreds of subjects, materials, and techniques to create art experiences for elementary school children. Each activity is highly appealing to children and can be done by children with a minimum of teacher help. This book provides direction, motivation, and materials to nurture creative, expressive art in children. The activities provide ample opportunity for the expression of children's skills, abilities, experiences, imagination, perceptions, ideas and feelings.

Seasonal activities and projects for special occasions, such as holidays, are presented throughout the book. Examples of representative work of each unit are also provided. The author encourages the teacher to select activities according to the needs of students. The activities are presented in their order of application from primary to upper grades.

Creative Arts and Craft Activities is a highly readable book for the elementary classroom art teacher.

CREATIVE BEHAVIOR GUIDEBOOK

Sidney J. Parnes

1967

List price: $2.95

How to Order: Charles Scribner's Sons
597 Fifth Avenue
New York, New York 10017

The Creative Behavior Guidebook is a reference source and teaching manual for the development of creative behavior. Teachers at all grade levels will find this book useful.

The book is divided into two sections. The first is concerned with the philosophy and psychology of creative behavior. The second section presents an instructional program for cultivating creative behavior. It offers guidelines for establishing a course in creative problem-solving, and offers examples and lecture material which the teacher can use. An appendix includes a bibliography of research abstracts, audio-visual aids, books, and methods for stimulating creativity, and several articles pertinent to guiding creative behavior. A workbook designed for adult level students is available with the Guidebook.

The Guidebook can be used by teachers at all grade levels, and its basic principles adapted for any classroom. The book is easy to read and well written.

CREATIVE BLUEPRINT TECHNIQUES FOR EVERYONE

Louise Watlers

1971

List price: $1.25

How to order: Academic Therapy Publications
1539 Fourth Street
San Rafael, California 94901

Blueprint making is an interesting and creative activity that can be enjoyed by any age. This booklet is directed to preschool and elementary teachers.

The booklet provides the teacher with directions for creating blueprints, with simple and more advanced activities, and a list of necessary materials and equipment. Blueprint making allows each child to express his own creativity through the arrangement of objects, plants, and flowers. The teacher guides the child in the activity, but the actual choosing, arranging, and developing are done by the child. Using blueprints can increase interest in different subject areas, such as nature studies, chemistry, and literature.

Creative Blueprint Techniques is written in an easy to read booklet form. Teachers will find that blueprint making offers exciting and productive classroom activities.

CREATIVE HANDBOOK IDEAS

Mary Jackson Ellis (Ed.)

1970

List price: $3.75

How to order: T. S. Denison and Company, Inc.
5100 West Eighty-second Street
Minneapolis, Minnesota 55437

Creative Handwork Ideas is a handy sourcebook of 87 ideas for activities which stresses originality. Each project relates to different aspects of a holiday theme. There are activities for each month of the year. Each page describes the materials that are needed for the activity and suggests procedures on how to do the activity. Each page also includes one sample drawing of the completed activity which was taken from actual completed projects of kindergarten children. The activities for the month of January, for instance, describe six activities that might be done with other activities of the school's daily program, such as poems and songs. These activities describe how to make a framed snow picture out of cotton, paste, yarn, and old Christmas cards or how to make a pair of mittens out of construction paper. Each activity is different and the teacher should expect that no two finished projects will be alike.

The idea of originality is stressed. These activities may be done individually or in groups. Some children may want to do one activity while others may want to do another. Each child is encouraged to use his/her ideas. The author stresses the idea that the more original the project the better.

This activity book is a good resource for the kindergarten teacher on activities for each month of the year.

CREATIVE HANDWORK

David E. Corney

1969

List price: $2.00

How to order: Academic Therapy Publications
1539 Fourth Street
San Rafael, California 94901

Creative Handwork is a guide to kindergarten activities that fosters creativity in art. The book is prefaced by a general guide to establishing a classroom environment that is conducive to learning, interaction, and discovery. The first part of the book is concerned with the manual skills necessary for children's handcrafting such as cutting, pasting, and folding. Each technique that is described has accompanying illustrations of procedures and creative examples and covers preparation, materials, and methods.

The second part of the book brings the techniques of the previous section together and offers suggestions for class and individual lessons and projects. Notes are included on planning and executing art-oriented activities and suggestions for specific themes and methods are offered to help children develop their own ideas.

The theme of the book is that handwork is best used in the classroom as a way of actively involving children in their own learning processes.

CREATIVE LEARNING AND TEACHING

E. Paul Torrance and R. E. Myers

1970

List price: $6.95

How to Order: Dodd, Mead, and Company
79 Madison Avenue
New York, New York 10016

This is an exciting book about teaching for creative thinking. Its message is not limited to any particular educational level nor to any particular group of people. It is especially useful to teachers, but can be used by administrators, supervisors, curriculum specialists, and interested laymen. The book attempts to aid teachers by increasing their awareness of their own creative potentialities and by improving their skills of identifying, developing and cultivating the creative abilities of their students.

While theoretical considerations are not neglected, the book is primarily concerned with the things the teacher can do in the classroom to foster creativity. Some examples of what the book offers to the teacher include ways in which the teacher can acquire skills to facilitate creative learning and ways in which the teacher can understand children. Chapters are also included which are concerned with improving the teacher's ability to ask questions, foster a more creative environment, and be more creative. The book also contains sample problems and illustrations of how the material could be used in the classroom.

The authors' personal styles of writing make the book easy to read and easy to use as a source in improving teachers' and students' creative abilities.

CREATIVE MOVEMENT FOR CHILDREN

Jack Wiener and John Lidstone

1969

List price: $7.95

How to Order: Van Nostrand Reinhold Co.
450 West 33rd Street
New York, NY 10001

A short skimming of pages in *Creative Movement for Children* stimulates the desire to take off one's shoes and socks and to create an image through body movement. Excellent photographs of young children and their expression through movement demonstrate well the types of movement a classroom teacher might teach his/ her students. The authors emphasize that experience in dance is not necessary for teaching creative movement. Their approach to creative movement for students is expressive, creative, and fun. Included in their description of types of movements and exercises of images is a chart suggesting which movement types are appropriate at each age, five through thirteen.

CREATIVE MUSIC FOR THE CLASSROOM TEACHER

James T. Luck

1971

List price: $5.95

How to order: Random House, Inc.
201 E. 50th Street
New York, New York 10022

Written to provide creative music experiences for elementary education students and in-service teachers, Creative Music for the Classroom Teacher may be successfully used by those who have limited backgrounds in music fundamentals. Step-by-step theory instruction in rhythm, melody, and harmonic accompaniment is followed by examples of rhythms, melodies, and harmonies. Assignments are then made so that teachers can create their own rhythm accompaniment and harmony arrangements to well-known songs such as "This Old Man," "Skip to My Lou," and "Red River Valley." Although classroom teachers might use the book more confidently in a workshop setting, their efforts in creating music arrangements should provide excellent materials for classroom use in music. Music teachers might find the book a valuable aid in creating their own arrangements and in instructing classroom teachers.

CREATIVE STORYTELLING

Carolyn Fitz

1971

List price: $3.95

How to order: The Leslie Press, Inc.
111 Leslie Street
Dallas, Texas 75207

Creative Storytelling is "a practical, how to, text designed to teach effective story selection and storytelling skills to teachers and library aids who will work in elementary schools." It teaches the techniques of the good story teller. It tells how to select books of quality that will appeal to particular groups of children.

Creative Storytelling includes three short dramas for primary grades with suggestions for simple props and costumes. It tells how to select and how to tell stories when English is a second language of the children. Modeling techniques and a discussion of how to use materials with the child who has a limited vocabulary and deficiencies in speech pattern are also presented.

This books is a reference source for storytellers. It shows how to select books by age group, sbbject, title, author, and availability. It provides classroom art activities which relate to specific picture books and also suggests how to recognize and relate to the child's emotions through storybooks.

Teachers will find this little book thoroughly enjoyable reading. The world of make believe becomes more alive, more wild, and more colorful for the child and teachers become better storytellers with the help of this friendly book.

THE CREATIVE TEACHER: A PRACTICAL GUIDE TO CLASSROOM ACTIVITIES

Grades 1, 2, 3: William Brush, Mary Pat Mullaney, Benny F. Tucker, and Kathleen Williams
Grades 4, 5, 6: Dolores Albrecht, Sharon Miller, and Nancy Speed

1974

List price: $3.95 each

How to Order: Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

The Creative Teacher consists of a series of six ideabooks, each specific for a grade from 1 to 6. The activities described, when carried out in the classroom, are intended to reinforce and enrich those skills normally taught at the particular grade level. Activities are oriented toward student involvement in learning, creativity, and open-ended group discussion of the concepts concerned. Each booklet is divided into sections dealing with language, social studies, science, and mathematics. The activities are presented in terms of purpose, necessary materials, procedure, and follow-up. Most materials needed are readily available in the elementary school environment, or are otherwise easily accessible. Some activities require only a few minutes of class time, while others may occupy children for a part or all of the school year.

The series is not designed to replace normal classroom work, but to provide the student with an enriching involvement in supplementary activities. The booklets are very readable, and directions are clear and uncomplicated. The suggested activities require pupils to become actively involved in learning and to think about and discuss what they read and hear. This book should be a valuable aid to the teacher.

CREATIVE TEACHING GAMES

Linda Polon and Wendy Pollitt

1974

List price: $4.95

How to order: T. S. Denison and Company, Inc.
5100 West Eighty-Second Street
Minneapolis, Minnesota 55437
(Order No. SBN - 513-01265-6)

Creative Teaching Games describes over forty educational games that are designed to stimulate and motivate children to learn in enjoyable ways. The games can be used with almost every subject taught in the elementary grades. Many of the games deal with reading. Other games cover some primary math concepts. The games may be played by one person at a time or in groups of two or three. Most of the games are competitive.

Each game is described in detail. The teacher is informed of how many children can play and what each child is to do during the game. The educational purpose of the game is described in terms of the reading or math skills that are used during the game. The teacher is told what materials are needed for the game and suggestions are made on how to make the game boards more durable for repeated use. Drawings accompany the text so as to make the construction of each game easily understandable.

This book is a highly readable source book of educational games as learning aids for the elementary grade teacher. The games are readily modifiable to a range of subject matter taught in the elementary grades.

CREATIVE TEACHING OF THE LANGUAGE ARTS IN THE ELEMENTARY SCHOOL

James A. Smith

1967

List price: $3.75

How to order: Allyn and Bacon, Inc.
150 Tremont Street
Boston, Massachusetts 02107

Creative Teaching of the Language Arts in the Elementary School presents techniques for fostering creativity in the language arts. The author begins with a general introduction to the nature of creative teaching and the nature of creative communication and goes on to discuss creative teaching of various areas of the language arts curriculum such as listening, grammar, and spelling. Each chapter begins with the theoretical concepts and ends with exercises in creative thinking and writing. One set of exercises is especially designed for teachers on the job and another set for prospective teachers in education courses.

This book is easy to read and the exercises should heighten reader interest and provide present and future teachers with useful techniques for stimulating creativity in their pupils.

CREATIVE WRITING FILMS

Produced by: Churchill Films

1972

List price: $205.00 each. Series: $780.00.

How to order: Churchill Films
662 North Robertson Boulevard
Los Angeles, California 90069

Creative Writing Films is a series of four open-ended films designed for grades five and six. Each film is in color and runs for approximately 10 to 15 minutes. Each film is set in a classroom where a creative writing teacher and students interact, depicting basic aspects of creative writing. Various film projector stops are provided, during which the students viewing the film engage in creative thinking and writing paralleling that done in the film. The first three films end with a reading and enactment of a story written by the children in the film.

The students use the ideas presented in the film as a spring board for writing. The films include: The Jail Door Went "Clang," in which students use sensory experiences to construct a dramatic setting; Mean, Nasty, Ugly Cinderella, which shows how characters influence a story; What's Riding Hood Without the Wolf?, which shows how to use the hero, his goal, and obstacles to construct a plot; and The Man Who Bought Monday Night, which deals with the origin of story ideas.

Each film may be used alone, but ideally they should be used as a series. A teacher's guide, which explains the content and use of each film, is included with the films.

CREATIVITY AND LEARNING

Jerome Kagan (Ed.)

1967

List price: $6.95

How to order: Houghton Mifflin Company
2 Park Street
Boston, Massachusetts 02107

Creativity and Learning presents an expanded discussion by 16 scientists, educational philosophers, and administrators on the problem of the identification and nurturance of creative ability.

The volume begins by exploring the nature of creativity. Discussion continues by comparing creativity in different fields and indicates how recent changes in our thinking about the relationship of creativity to the arts and sciences have increased the use of teaching machines and computers. Throughout the volume, the authors invariably suggest the necessity of greater tolerance for error in the learning process and encouragement of creative ability. Jerome B. Wiesner, E. Paul Torrance, Lawrence S. Kubie, Philip H. Abelson, Caryl P. Haskins, Michael A. Walach, Philip W. Jackson, and Samuel Messisk are a few of the discussants.

Creativity and Learning speaks of theoretical considerations and therefore is not light reading. The discussions are penetrating, however, and provide a good source of insight for the reader into the nature, identification and nurturance of creative ability.

DEVELOPING CHILDREN'S THINKING THROUGH SCIENCE

Ronald D. Anderson, Alfred DeVito, Odvard Egil Dyrli, Maurice Kellogg, Leonard Kochendorfer, James Weigand

1970

List price: $6.95.

How to order: Prentice-Hall, Inc.
Englewood Cliffs, New Jersey 07632

This book presents a thorough description of the "why's and how's," the "do's and don't's," of teaching elementary science. The teaching methods and ideas that are treated arise from the authors' belief that student involvement and problem-solving result in a true understanding of what science is all about. Through questioning and experimenting students become deeply involved in science. This is the ultimate goal of science teaching.

The text begins with a statement of the authors' science teaching philosophy. Subsequent chapters treat objectives, methods and techniques, resources, evaluation, curriculum design, and other facets of teaching. One chapter is specifically devoted to creativity in teaching, covering current theory and offering ideas and methods that encourage discovery and problem solving in the science curriculum.

Very practical suggestions are offered in the text, such as ideas for experiments, test construction, and audiovisual aids. The book treats all aspects of teaching, all of the challenges and problems associated with it, from the point of view of the science teacher.

DISCOVERING THE PHYSICAL WORLD

Alice Yardley

1970

List price: $2.65

How to order: Citation Press
Library and Trade Division
Scholastic Magazines, Inc.
50 West 44th Street
New York, New York 10036

This book focuses on discovery learning in the British infant school. The author begins the book with five helpful chapters of introduction explaining the importance and effectiveness of discovery learning. She also discusses the development of mathematical thinking using Piaget's theories. The following chapters are mostly concerned with discovery experiences in general science. For example, the author has a chapter each for such things as measurement, time, shape, soil and living things, water, air, light, sound, heat, the body, geography, and history.

Each chapter includes anecdotal descriptions of what the author has used or has observed. The teacher can get many ideas from these descriptions that can be adapted or used as they are described. Suggestions are also offered for materials the teacher should attempt to stockpile and ways in which they might be used. Since the author gives plenty of examples, the teacher has the benefit of knowing about very specific ways in which certain materials can be used, and knowing that they have been effective in the hands of other teachers. The author also demonstrates how interest in one thing can lead the students to many other learning experiences, each one being motivated by the students' own interest.

The book is easy to read, contains suggestions for further reading, and is indexed.

ELEMENTARY CREATIVE BULLETIN BOARDS

Joanne Homich

1969

List price: $1.75

How to order: Citation Press
Professional Relations Division
Scholastic Magazines, Inc.
50 West 44th Street
New York, New York 10036

This book was written for the elementary school teacher who does not have the time to plan his/her own bulletin boards. The authors suggest some practical guides for the construction of bulletin boards. The book is organized into seven chapters concerned with reading, grammar and punctuation, composition, mathematics and science, social studies, poetry and sample bulletin boards. Almost every other page of this book contains a sample bulletin board which the teacher can use in his/her classroom. Simple directions and materials needed are suggested for each bulletin board.

The author points out that bulletin boards are effective because they present a strong visual stimulus, reinforce lessons, increase motivation, serve to display student work, and stimulate free responses from students.

GUIDELINES TO CREATIVE DRAMATICS

Margaret S. Woods and Beryl Trithart

1970

List price: $2.00

How to order: D. O. K. Publishers Inc.
711 East Delavan Avenue
Buffalo, New York 14215

Guidelines to Creative Dramatics is a collection of 13 suggested rhythmic and dramatic activities for children at the preschool, kindergarten, and first grade levels. The activities are intended to promote familiarization and appreciation of literature, an increased vocabulary, and interest in reading. In addition, more social and human objectives are involved, among them an appreciation and knowledge of oneself and others in personal interaction, plus a sense of responsibility, values, potential, and self-fulfillment.

Each selection contains a section on materials, procedure, objectives, and other relevant information. A bibliography is included that refers to other publications on children's dramatics and storytelling.

The activities are directed towards bringing children into close personal contact with nature, literature, and other people. They are concerned with appreciation and knowledge of the sights and sounds common to their experiences. Questions are suggested that stimulate the imagination and invite participation. Music from folk to children's to classical is an integral part of almost every activity. Sounds and physical movement are important to the goals of all of them. In some cases poetry and music are presented and children are encouraged to act out their feelings towards what they hear by means of movement and speech.

GUIDING YOUR CHILD TO A MORE CREATIVE LIFE

Fredelle Maynard, Ph.D.

1973

List price: $7.95

How to order: Doubleday & Company
501 Franklin Avenue
Garden City, New York 11530

This book is addressed to parents who want to help their children develop creative abilities and better personal and social adjustment. However, it would also be a good reading source for teachers who do not know very much about creative thinking. It could also be read profitably by children in the upper grades and in junior and senior high school as a guide to developing one's own creative thinking.

The chapters are written in a very informal, simple style. The book incorporates good ideas from research and practical applications for teaching creative thinking. An introductory chapter tells about the nature of creative thinking. The book presents chapters on fostering creativity through play, art activities, musical experiences, dance, and family togetherness projects. The chapters are loaded with references to books, other good sources of information, material, and project ideas. This is a practical book which can be of great value to teachers, although parents and children will also enjoy reading it.

HAILSTONES AND HALIBUT BONES (Part I and Part II)

Distributed by:
Sterling Educational Films
241 East 34th Street
New York, New York 10016
(212) 683-6300

Hailstones and Halibut Bones is a colorful, magical mixture of sounds and images which will dramatically sensitize the children to their own environment. Using each color as the beginning point of inquiry, children are made aware of all their senses and emotions in relating to these colors. The use of music and rhyme enhances the movement of the sounds and images of the film so that colors become alive and are felt by all the child's senses. Blue, for example, is not merely color but is cool, proud, distant, and beautiful.

Hailstones and Halibut Bones can be used by elementary teachers to extend children's perceptions of their own feelings and the world around them and stimulate creative ideas and feelings beyond the ordinary.

HOW TO SOLVE A PROBLEM

Produced by: Paul Burnford Film Productions, Inc.

1968

Distributed by: BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

The film demonstrates and treats the idea of solving problems. Intended for primary-level children it shows young children who are faced with problems and shows the steps that they go through to discover solutions. Concepts such as the importance of trying out various solutions are presented, as the narrator discusses what the children do and asks the viewers what they would do in such circumstances. A guide is included with the film that explains its objectives, offers suggestions for discussion, and presents a list of words relevant to the solving of the film's problems. How to Solve a Problem introduces the inevitability of problems to children, and shows them how problems can be solved.

HUMANITIES PROGRAMS TODAY

Richard Adler (Ed.)

1970

List price: $3.65

How to order: Scholastic Magazines, Inc.
901 Sylvan Avenue
Englewood Cliffs, New Jersey 07632
or
Citation Press (Publishers)

New York, New York 10036

Humanities Programs Today is a collection of 35 descriptions and evaluations of certain innovative humanities programs throughout the United States. Each description is written by someone close to the individual program and includes a section on the objectives, approach, materials, and an evaluative conclusion about the program.

The underlying belief common to all of the programs is that the humanities should be and can be a source not of facts but of inspiration and training in meaningfully investigating, understanding, and dynamically interacting with the world and with others. Program emphasis is on discovery learning and inquiry in a relatively unstructured, uncritical atmosphere of understanding and self-awareness. Such topics as values, aesthetics, history, and man in relation to his environment are explored through field trips, multimedia presentations, individual study and writing and other methods that create an atmosphere less rigid and fact-oriented than traditional humanities courses.

Perhaps what the teacher can best derive from this collection is a good idea of what can be done in teaching the humanities in a truly inquiry-based, student-involvement mode.

Humanities Programs Today demonstrates that education need not be completely an absorption of facts.

IMAGINATION, INVENTIVENESS, RESOURCEFULNESS

Produced by: Moreland-Latchford Productions Ltd.

1968

How to order: Sterling Educational Films, Inc.
241 East 34th Street
New York, New York 10016
Rental

This film is a guide for the teacher on how elementary children can be stimulated and encouraged in creative play and problem solving. Activities that are presented include using the imagination to generate different uses for everyday objects (brooms, cartons, etc.) and solving a problem in a new way. Puppets are used to demonstrate concepts, and the films recommends asking the child "how would you solve this problem?" The narration suggests relevant teaching methods and points out alternative activities for the teacher.

INQUIRY IN THE SOCIAL STUDIES

Rodney F. Allen, John V. Fleckenstein, Peter M. Lyon (Eds.)

1971

List price: $2.25

How to order: National Council for the Social Studies
A National Affiliate of the National
Education Association
1201 Sixteenth Street, N.W.
Washington, D.C. 20036

Inquiry in the Social Studies presents theories and examples of the inquiry process for classroom teachers. Social studies teachers at all grade levels will find this book helpful.

The book presents the concepts of inquiry through current literature on teaching for inquiry skills. The first part of the book contains articles dealing with the theory and rationale behind inquiry by such authorities as Jerome Bruner, J. Richard Suchman, and C. Benjamin Cox. The second part of the book examines strategies and gives examples of the inquiry process. Articles by John Dewey, Byron Massialas, and Charlotte Crabtree are found in this section. Teachers can use this book to identify important aspects of the inquiry approach. The articles in the second section present ways for applying these aspects in the classroom.

Although some of the articles have a high level, theoretical orientation, the book offers clear guidance for classroom application of the inquiry process in teaching.

MIND GAMES

Robert Masters and Jean Houston

1972

List price: $2.65

How to order: Dell Publishing Company, Inc.
1 Dag Hammarskjold Plaza
New York, New York 10017

Mind Games is an exciting book of mental exercises which can be used to induce willing participants to change their usual states of consciousness to less usual ones. The games may be played by anyone sufficiently mature and intelligent to understand why the games are being played, to be able to respond to the demand of the games, and to be able to make the personal, free decision to be a participant. However, primary level children will not ordinarily have the needed maturity and understanding to be able to make an adequate response to the games as presented in this book. The games, however, will help the teacher understand how much of the mind is left untouched by ordinary educational practices.

The book consists of a series of programs for achieving altered states of consciousness. Each section suggests techniques to reach an altered state of consciousness, details of the exercise, and procedures for returning to ordinary consciousness.

The games have very practical application. They draw on the latest discoveries about consciousness and about man's latent capacities and show how these findings can be applied to group games for educational purposes. Those who play these games should become more imaginative, more creative, more fully able to gain access to their mental capacities and to use their capacities productively.

MORNING, NOON, AND EVENING

Produced by: Films/West, Inc. California

1970

How to order: Aims Instructional Media Services, Inc.
P.O. Box 1010
Hollywood, California 90028
Rental

This film can be used with elementary level children. It presents a stimulating sunup to sundown montage of Americans going about their daily lives. It compares and contrasts their various ways of living, working, and relaxing in the city, the suburbs, and the country. There is no continuous narration, but the scenes that are depicted can serve as a springboard for a student's creative expression of his/her thoughts and feelings about what he/she is seeing. The film is recommended as a basis for student inquiry and discussion about the different ways in which people live.

PAPER ART FILMLOOP SERIES

Produced by: Ikno Films

List price: $21.00 per filmloop

How to order: Bailey-Film Associates Educational Media
2211 Michigan Avenue
Santa Monica, California 90401

The Paper Art Filmloop Series explores the uses of paper as an art source. It is aimed at primary and elementary grade students.

There are six 8mm filmloops which run for approximately three minutes each. All filmloops are silent and in color. Each filmloop concentrates on the steps involved with using paper in a particular manner and shows the results that can be obtained. The areas covered by the filmloops include: texture collage, relief pictures, a perception box, a paper city, life-size puppet, and paper flags.

The filmloops are easily accessible to the individual student, or may be viewed by a larger group. They encourage the use of imagination and challenge students to use a common material in uncommon ways. A manual is available to the teacher which describes the content and objectives of the filmloops.

PARTNERS IN LEARNING: A CHILD CENTERED APPROACH TO TEACHING THE SOCIAL STUDIES

Lee Bennett Hopkins and Misha Arenstein

1971

List price: $2.95

How to order: Citation Press
Library and Trade Division
Scholastic Magazines, Inc.
50 West 44th Street
New York, New York 10036

The philosophy of this book is that once the child can be involved in the processes of learning, teaching becomes a partnership between the learner and his guide. The book attempts to realize this goal by offering concrete methods, descriptions of successful exercises, suggestions for materials and many more practical and realistic ideas. It also tells where materials may be obtained, states their cost, gives brief descriptions and tells how they can be implemented in social studies programs. This 237 page book is an excellent source for the teaching of social studies in grades K-6.

The book is broken down into specific topic areas allowing the reader to start from the beginning or at any other part. The early part of the book describes some general "how to" rules and should be read by any teacher contemplating the more active child-centered classroom.

The two teachers who have written the book have made it easy to read and have offered more methods, sources, ideas and practical exercises than the average teacher could ever use.

PASSAGES: A GUIDE FOR PILGRIMS OF THE MIND

Marianne S. Anderson and Louis M. Savard (Ed.)

1972

List price: $4.95

How to order: Order from Harper and Row, Publishers, Inc.
10 East 53rd Street
New York, New York 10022

Passages is a book of mind exercises intended to lead to a new awareness of life. It is an invitation to students and teachers to harness those positive and creative sources of energy within themselves and to realize their long-dormant potential for clear thinking and feeling.

This guide consists of 13 mental exercises of a practical and spiritual nature. In each case the goal of the exercise is clearly stated, as well as the approximate time the exercise will take to complete. Then, an induction technique is suggested to reach an altered state of consciousness and the details of the exercise are given. A procedure for returning to ordinary consciousness is provided.

Passages can be used with exciting results in an educational setting to enhance creativity, awareness, and sensitivity to oneself and to others. Because these exercises use mental imagery rather than words to stimulate creative functioning, they should be particularly effective for use with disadvantaged youths.

This book can be an invaluable tool for teachers in creating mental warm-up exercises for stimulating the creative functioning of children.

PSYCHOLOGY OF PROBLEM SOLVING THEORY & PRACTICE

Gary R. Davis

1973

List price: $7.95

How to Order: Basic Books, Inc., Publishers
10 E. 53rd Street
New York, New York 10022

The stimulation of creative thinking is a widely accepted goal of education but one that is not ordinarily thought of in terms of observable attainments. This exciting book clarifies the nature of creative human problem-solving skills and describes reasonable principles for their improvement. Attitudes which promote new ideas are explored, cognitive abilities which contribute to the production of new ideas are identified, and particular techniques which help in the generation of ideas are described. Bionics (the biological-based engineering strategy), idea checklists, metaphorical synectics, attribute listing, and brainstorming are just some of the practical techniques that can be effectively used by the elementary teacher.

Psychology of Problem Solving clearly demonstrates how to develop workable and creative solutions to problems. Well researched creative thinking and problem solving programs such as the Saturday Subway Ride, Thinking Creatively, and Write? Right! are thoroughly described. Information on tests and measures of creativity is provided. Teachers will find this clearly written book a good source of ideas for the systematic teaching of problem-solving and creativity.

PUT YOUR MOTHER ON THE CEILING

Richard DeMille

1973

List price: $2.25

How to order: The Viking Press, Inc.
625 Madison Avenue
New York, New York 10022

Put Your Mother on the Ceiling deals with children's imagination games. It is directed towards the young child, kindergarten, and elementary grade levels.

The book is arranged into three sections. The first section gives the rationale behind the book; that is, for a child to fully understand reality, he/she must also understand his/her own imagination. The middle section focuses on the steps needed to prepare a child for the imagination games. A number of imagination games are found in the final section.

The games actively involve both the child and the teacher. The games are written for a single child, but instructions for adapting them to a larger group are given. The teacher, then, is free to work with an individual child or a group of children. The games are not intended for use with specific curricula, but rather as practical exercises which allow children to explore their own imaginative skills.

The book is clearly written and is easy to read and understand. It will be helpful to any teacher who is interested in improving children's imaginations.

READY-MADE BULLETIN BOARDS FOR ELEMENTARY SCHOOLS

Lynne G. Miller

1974

List price: $2.95

How to order: Citation Press
Library and Trade Division
Scholastic Magazines, Inc.
50 West 44th Street
New York, New York 10036

This is a book of 32 ready made and illustrated bulletin boards for the busy elementary school teacher. General guidelines are suggested for bulletin board construction. Bulletin boards are suggested for the areas of language arts, science and math, social studies and health, art and behavior. A chapter on "do it yourself" bulletin boards is also included.

SCAMPER

Robert F. Eberle

1971

List price: $2.00

How to Order: The D.O.K. Publishers, Inc.
771 East Delevan Avenue
Buffalo, New York 14215

Scamper is a booklet which presents games for the development of imagination in elementary school children.

In the introduction, the author explains the theory and rationale and gives directions for "Scampering." A single child, or a group of children, and one adult can play the Scamper games. The teacher presents ideas and cues verbally, and the children are free to explore their own imaginations. The games are designed to increase children's imagination skills, not to develop their skills in a specific subject area.

The theory and directions in the booklet are clearly written and easy to understand. Teachers who wish to increase imaginative abilities and creative skills in their students will find these games helpful.

SLITHERY SNAKES AND OTHER AIDS TO CHILDREN'S WRITING

Walter T. Petty and Mary E. Bowen

1967

List price: $3.95

How to order: Order from Appleton Century Crofts
Educational Division
440 Park Avenue South
New York, New York 10016

Slithery Snakes . . . is a delightful book addressed to elementary teachers interested in teaching creative writing.

The book is organized so that each chapter deals with a specific aspect of creative writing. Each chapter contains a rationale and explanation of the concept presented, and is followed by practical suggestions and activities for the classroom teacher. The first chapters of the book prepare the teacher to launch a successful creative writing program.

This book has very practical applications. It is filled with methods of presentation, ideas, and suggestions for creative writing activities. It also contains examples of student work and guidelines for determining program goals and evaluation of results.

Writing concepts encountered within creative writing include: word and sentence qualities, different forms of writing (autobiography, poetry, journal reports, etc.), idea organization, and writing tools and techniques (personification, alliteration, onomatopoeia, etc.).

The books is easy to read and well organized. It can be readily adapted as an idea resource book. The information in the book is useful and concisely presented.

TEACHING SCIENCE AS CONTINUOUS INQUIRY

Mary Budd Rowe

1973

List price: $10.95

How to order: Webster/McGraw-Hill
P. O. Box 965
Paoli, Pennsylvania 19301

Code No. 054115-9

This exciting text offers the teacher a thorough discussion of the inquiry method of teaching science. It is not a cookbook nor a how-to-do-it volume. Rather it offers an honest and realistic discussion of the relationships between the organization of ideas in science, the characteristics of learners, and the settings in which they learn. It describes a teaching method in which the teacher leads the students to draw their own conclusions from available data.

It is an extremely useful and readable text for elementary science teachers.

WHEN CHILDREN THINK

Gabriel Jacobs

1970

List price: $1.95.

How to order: Teachers College Press
Teachers College
Columbia University
New York, New York 10016

This is an exciting and very encouraging account of one teacher's experiences in developing children's thinking and creative skills through the use of journals. Working with fifth, sixth, and seventh-graders, the author developed a method that encourages open and free expression of student's ideas. The book describes the thoughts and ideas that led up to the production of the journal writing program and also treats the particular difficulties and conflicts that followed. The text is interspersed throughout with students' own journal entries which illustrate the thoughtful, creative, and sometimes nearly brilliant musings and ideas that have been a result of the program.

The book serves as an example and as a guide for the teacher who wants to encourage the creative growth of students through original writing. The program could be a part of the language arts curriculum or it could be considered as an enriching supplement to the regular curriculum.

YELLOW PAGES OF LEARNING RESOURCES

Richard S. Wurman (Ed.)

1972

List price: $1.95

How to order: Order from The MIT Press
Massachusetts Institute of Technology
Cambridge, Massachusetts 02142

Yellow Pages of Learning Resources is a book full of questions which invite the child to discover the city as a learning resource. By planting the seed of inquiry (eg. what can you learn from a carpenter? at a cemetery? from a dry cleaner? from a locksmith?), Yellow Pages of Learning Resources stimulates the curiosity of children and builds a desire to go and find out what one can learn from a carpenter, at a cemetery, or from a dry cleaner.

Children, high school students, parents, and teachers will all find this attractive book (it looks like a telephone directory with advertisements) full of ideas and questions that can be answered in the city. Besides the classroom and teachers, the most valuable resources for learning are people, places, and the processes of the cities, towns or villages in which we live. This book helps teachers and children use those resources.

It is an attractive and stimulating resource book.